

i6A4W010A033V-001-R

EVALUATION DATA

型式データ

INDEX

	PAGE
1. 測定方法 Evaluation Method	
1-1. 測定回路 Measurement circuits	3
(1) 静特性、待機電力特性、通電ドリフト特性、その他特性 Steady state, Standby power, Warm up voltage drift and Other characteristics	
(2) 出力リップル、ノイズ波形 Output ripple and noise waveform	
1-2. 使用測定機器 List of equipment used	4
2. 特性データ Characteristics	
2-1. 静特性 Steady state characteristics	
(1) 入力・負荷・温度変動 Regulation - line and load, Temperature drift	5
(2) 出力電圧・出力リップルノイズ電圧 対 入力電圧 Output voltage and Output ripple and noise voltage vs. Input voltage	7
(3) 入力電流・効率 対 出力電流 Input current and Efficiency vs. Output current	10
(4) 効率 対 入力電圧 Efficiency vs. Input voltage	13
(5) 効率 対 温度 Efficiency vs. Temperature	16
(6) 起動・遮断電圧特性 Start up and Drop out voltage characteristics	19
2-2. 待機電力特性 Standby power characteristics	22
2-3. 過電流保護特性 Over current protection (OCP) characteristics	23
2-4. 出力立ち上がり・立ち下がり特性 Output rise and fall characteristics	26
2-5. 過渡応答(負荷急変)特性 Dynamic load response characteristics	38
2-6. 出力リップル、ノイズ波形 Output ripple and noise waveform	40

使用記号 Terminology used

	定義	Definition
V _{in}	入力電圧	Input voltage
V _o	出力電圧	Output voltage
V _{rc}	RC電圧	RC voltage
I _{in}	入力電流	Input current
I _o	出力電流	Output current
T _a	周囲温度	Ambient temperature
f	周波数	Frequency

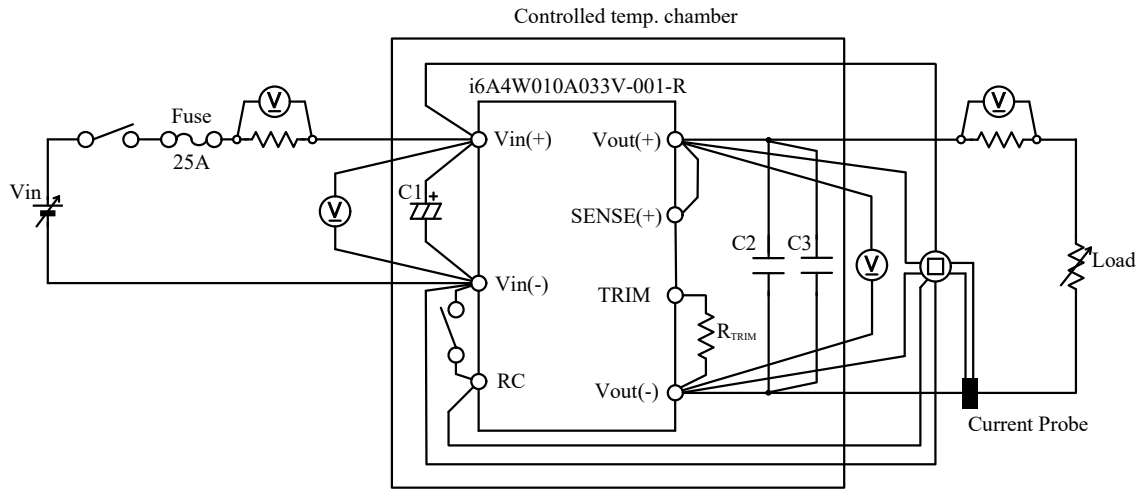
※ 当社測定条件における結果であり、参考値としてお考え願います。
Test results are reference data based on our measurement condition.

1. 測定方法 Evaluation Method

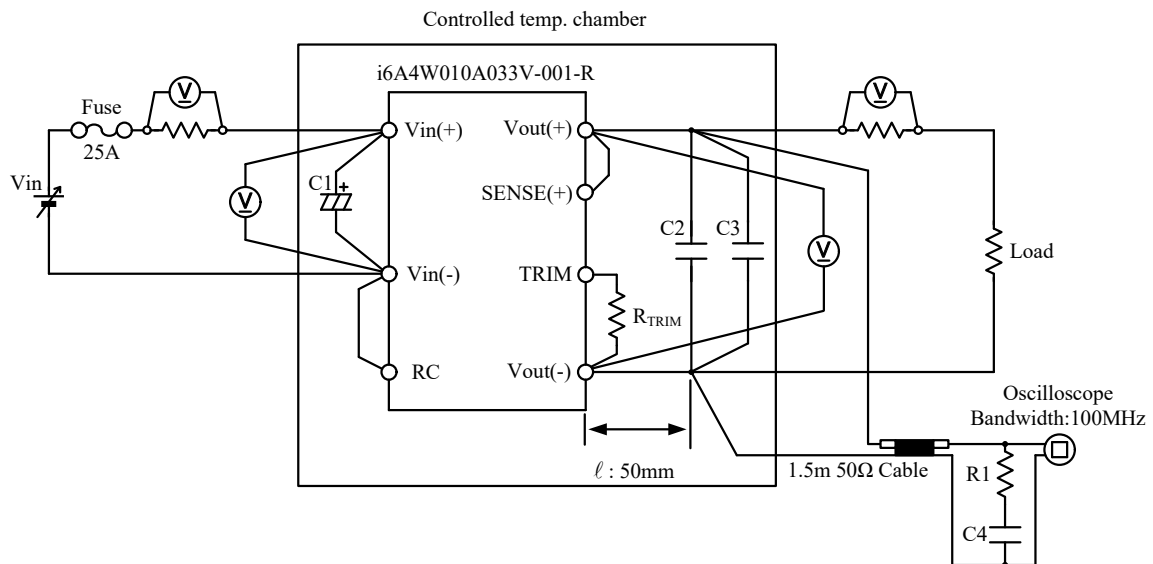
1-1. 測定回路 Measurement Circuits

(1) 静特性、待機電力特性、通電ドリフト特性、その他特性

Steady state, Standby power, Warm up voltage drift and Other characteristics



(2) 出力リップル、ノイズ電圧波形 Output ripple and noise voltage and waveform



- | | |
|------------------|------------------------|
| C1 : 120 μ F | Electrolytic Capacitor |
| C2 : 22 μ F | Ceramic Capacitor |
| C3 : 1000pF | Ceramic Capacitor |
| C4 : 4700pF | Ceramic Capacitor |
| R1 : 50 Ω | |

1-2. 使用測定機器 List of equipment used

	EQUIPMENT USED	MANUFACTURER	MODEL NO.
1	DIGITAL STORAGE OSCILLOSCOPE	YOKOGAWA ELECT.	DLM2054 / DL9040L
2	DIGITAL STORAGE OSCILLOSCOPE	LeCroy	6050A
3	DIGITAL MULTIMETER	AGILENT	34970A
4	CURRENT PROBE	YOKOGAWA ELECT.	701929
5	SHUNT RESISTER	YOKOGAWA ELECT.	2215
6	DYNAMIC DUMMY LOAD	TAKASAGO	FK-600L
7	DC POWER SUPPLY	KIKUSUI	PWR800L
8	CONTROLLED TEMP. CHAMBER	ESPEC	SU-641

2. 特性データ Characteristics

2-1 静特性 Steady state data

(1) 入力変動、負荷変動、温度変動 Regulation - line and load, Temperature drift

Vo=3.3V

1. Regulation - line and load

Condition Ta : 25 °C

Io \ Vin	9VDC	12VDC	24VDC	48VDC	Line regulation	
0%	3.306V	3.305V	3.304V	3.303V	3mV	0.091%
50%	3.303V	3.302V	3.303V	3.304V	2mV	0.061%
100%	3.300V	3.299V	3.299V	3.300V	1mV	0.030%
Load regulation	6mV	6mV	5mV	4mV		
	0.182%	0.182%	0.152%	0.121%		

2. Temperature drift

Conditions Vin : 24 VDC
Io : 100 %

Ta	-40°C	25°C	85°C	Temperature stability	
Vo	3.293V	3.299V	3.298V	6mV	0.182%

Vo=5V

1. Regulation - line and load

Condition Ta : 25 °C

Io \ Vin	9VDC	12VDC	24VDC	48VDC	Line regulation	
0%	5.005V	5.004V	5.003V	5.004V	2mV	0.040%
50%	4.998V	4.997V	4.998V	4.999V	2mV	0.040%
100%	4.991V	4.990V	4.990V	4.991V	1mV	0.020%
Load regulation	14mV	14mV	13mV	13mV		
	0.280%	0.280%	0.260%	0.260%		

2. Temperature drift

Conditions Vin : 24 VDC
Io : 100 %

Ta	-40°C	25°C	85°C	Temperature stability	
Vo	4.977V	4.990V	4.992V	15mV	0.300%

Vo=12V

1. Regulation - line and load

Condition Ta : 25 °C

Io \ Vin	16VDC	24VDC	48VDC	Line regulation	
0%	12.017V	12.022V	12.025V	8mV	0.067%
50%	11.997V	12.000V	12.000V	3mV	0.025%
100%	11.974V	11.973V	11.975V	2mV	0.017%
Load regulation	43mV	49mV	50mV		
	0.358%	0.408%	0.417%		

2. Temperature drift

Conditions Vin : 24 VDC
Io : 100 %

Ta	-40°C	25°C	85°C	Temperature stability	
Vo	11.928V	11.973V	11.985V	57mV	0.475%

2. 特性データ Characteristics

2-1 静特性 Steady state data

(1) 入力変動、負荷変動、温度変動 Regulation - line and load, Temperature drift

Vo=15V

1. Regulation - line and load

Condition Ta : 25 °C

Io \ Vin	19VDC	24VDC	48VDC	Line regulation	
0%	14.989V	14.995V	15.001V	12mV	0.080%
50%	14.965V	14.968V	14.967V	3mV	0.020%
100%	14.935V	14.933V	14.934V	2mV	0.013%
Load regulation	54mV	62mV	67mV		
	0.360%	0.413%	0.447%		

2. Temperature drift

Conditions Vin : 24 VDC
Io : 100 %

Ta	-40°C	25°C	85°C	Temperature stability	
Vo	14.887V	14.933V	14.942V	55mV	0.367%

Vo=24V

1. Regulation - line and load

Condition Ta : 25 °C

Io \ Vin	28VDC	36VDC	48VDC	Line regulation	
0%	23.993V	24.012V	24.022V	29mV	0.121%
50%	23.956V	23.955V	23.955V	1mV	0.004%
100%	23.900V	23.898V	23.899V	2mV	0.008%
Load regulation	93mV	114mV	123mV		
	0.388%	0.475%	0.512%		

2. Temperature drift

Conditions Vin : 36 VDC
Io : 100 %

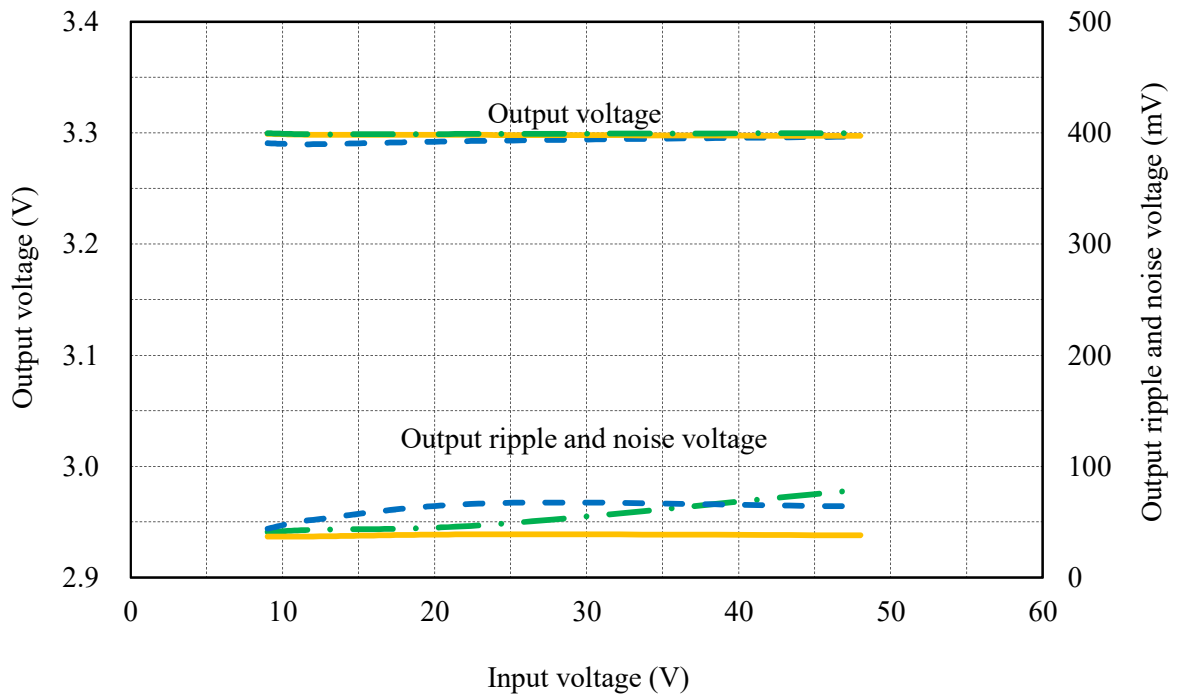
Ta	-40°C	25°C	85°C	Temperature stability	
Vo	23.815V	23.898V	23.905V	90mV	0.375%

(2) 出力電圧・出力リップルノイズ電圧 対 入力電圧

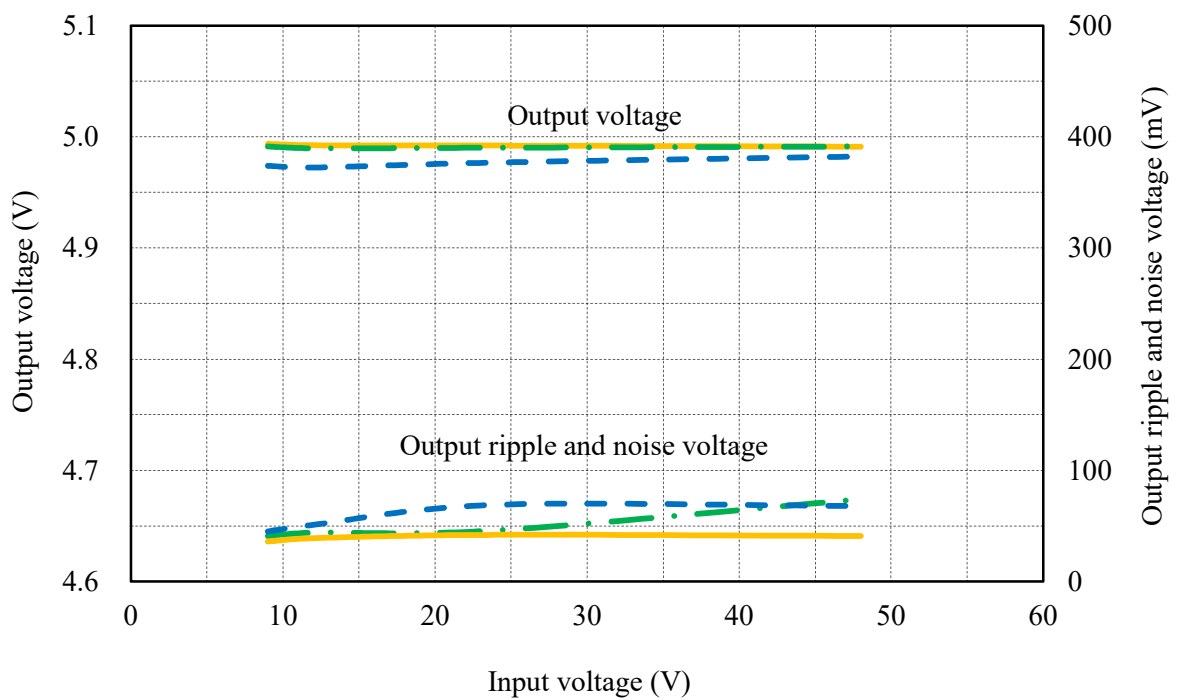
Output voltage and Output ripple and noise voltage vs. Input voltage

Conditions I_o : 100 %
 T_a : -40 °C ---
 : 25 °C - · -
 : 85 °C —

$V_o=3.3V$



$V_o=5V$

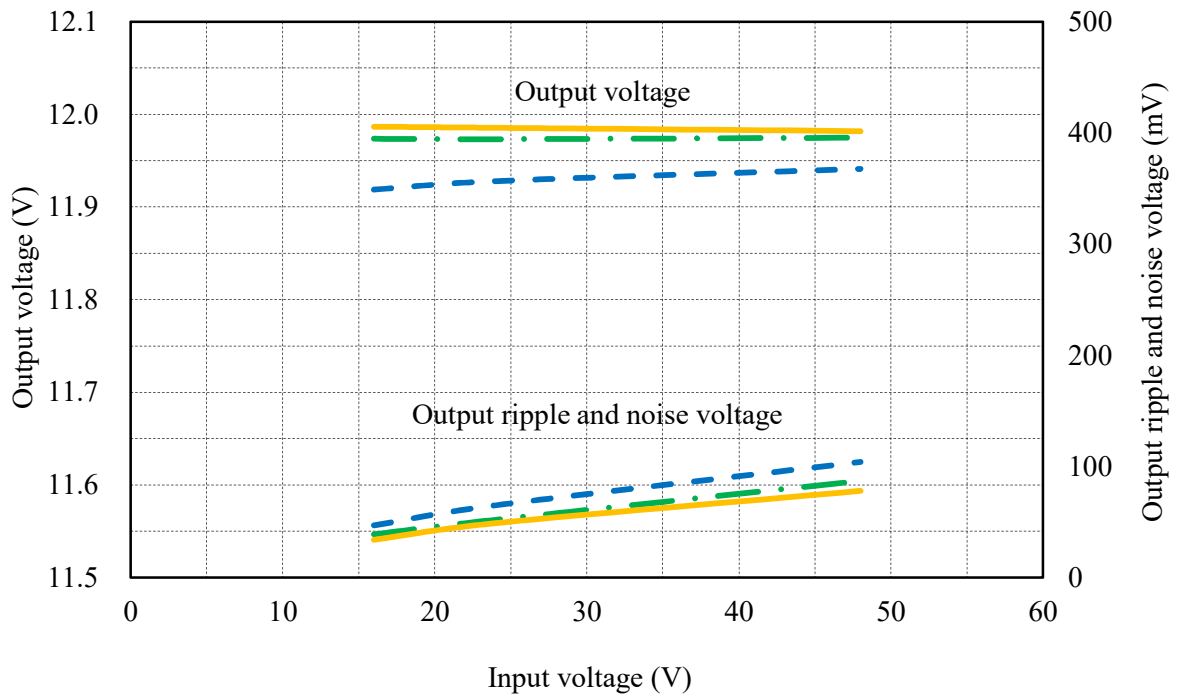


(2) 出力電圧・出力リップルノイズ電圧 対 入力電圧

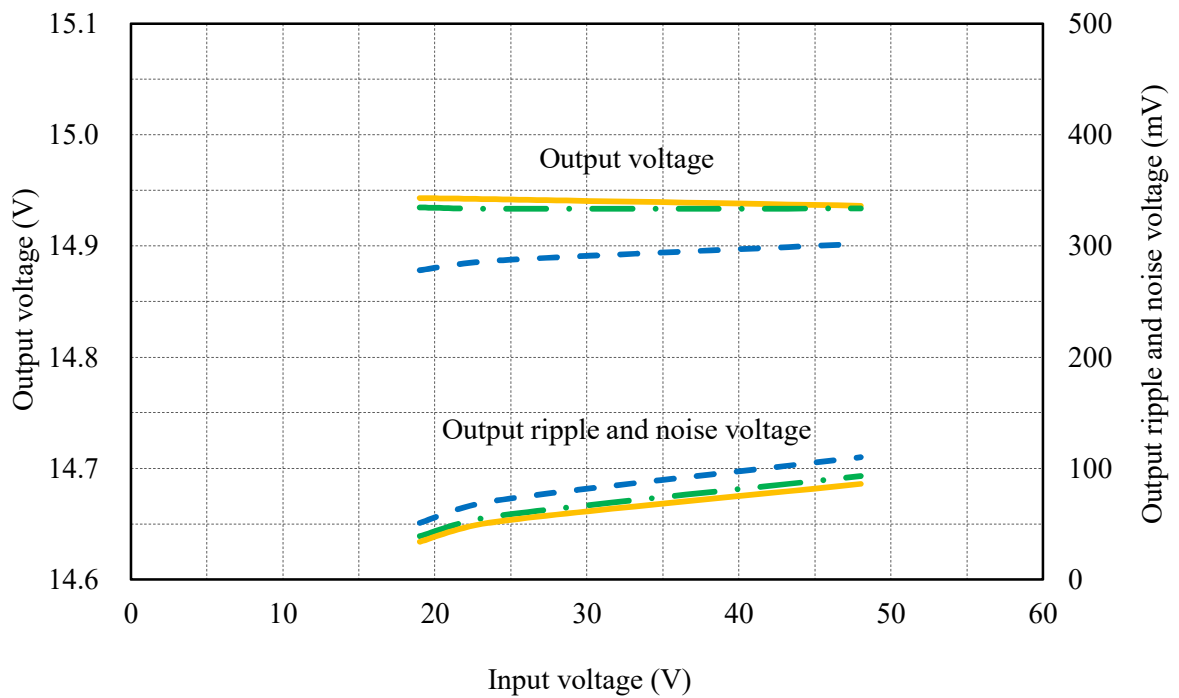
Output voltage and Output ripple and noise voltage vs. Input voltage

Conditions I_o : 100 %
 T_a : -40 °C ---
 : 25 °C -.-
 : 85 °C —

$V_o=12V$



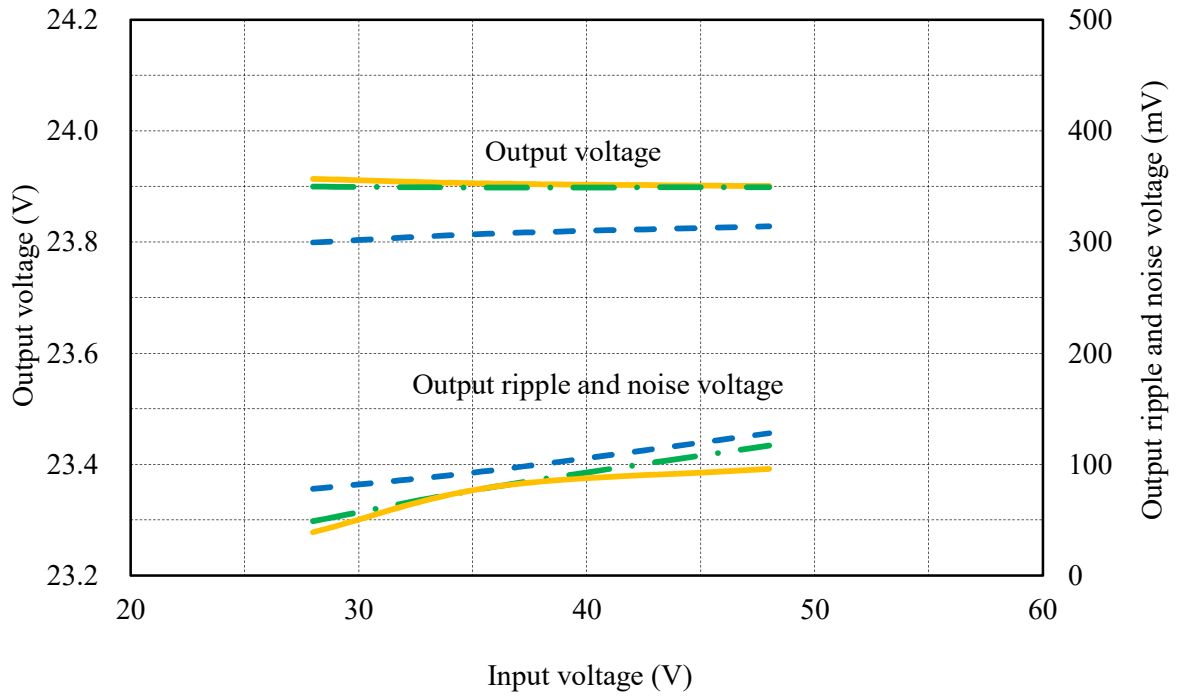
$V_o=15V$



(2) 出力電圧・出力リップルノイズ電圧 対 入力電圧

Conditions I_o : 100 %
T_a : -40 °C ---
 : 25 °C -.-
 : 85 °C —

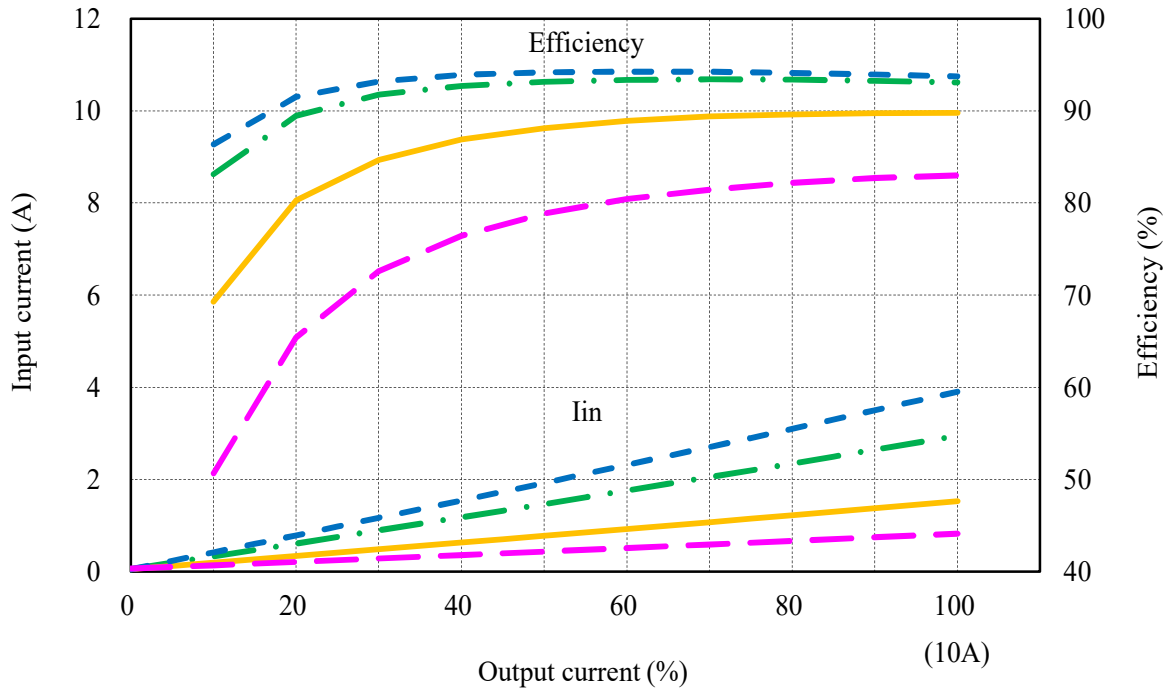
Vo=24V



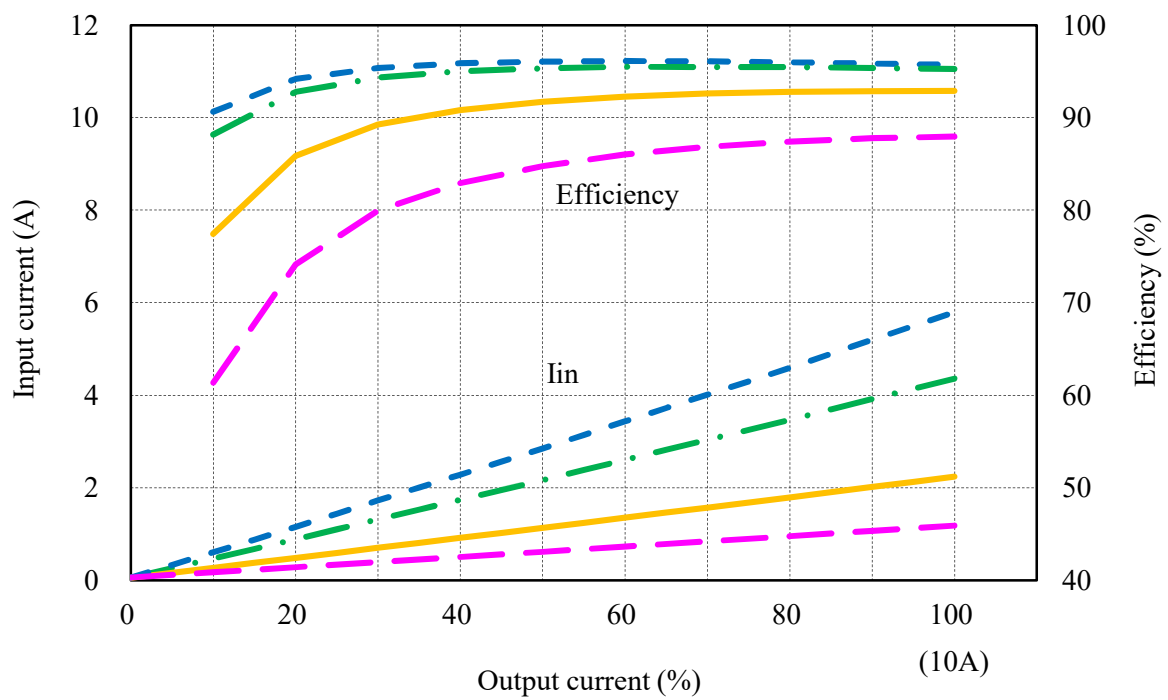
(3) 入力電流・効率 対 出力電流 Input current and Efficiency vs. Output current

Conditions V_{in} : 9 VDC ---
 : 12 VDC -.-
 : 24 VDC —
 : 48 VDC - - -
 T_a : 25 °C

$V_o=3.3V$



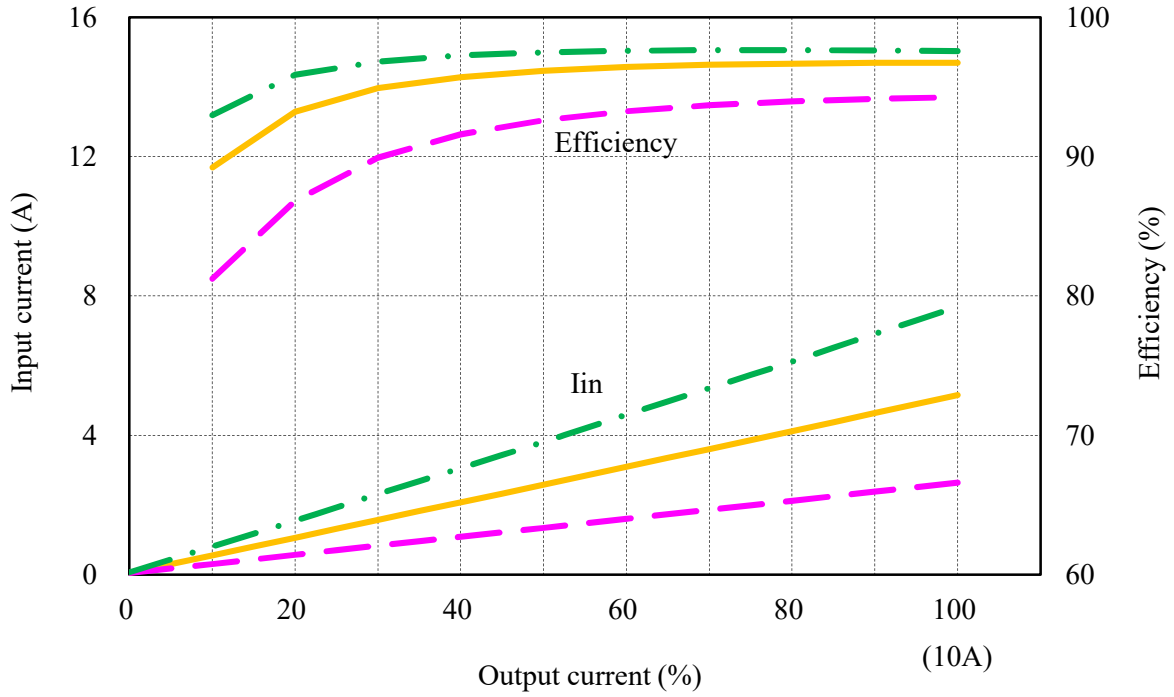
$V_o=5V$



(3) 入力電流・効率 対 出力電流 Input current and Efficiency vs. Output current

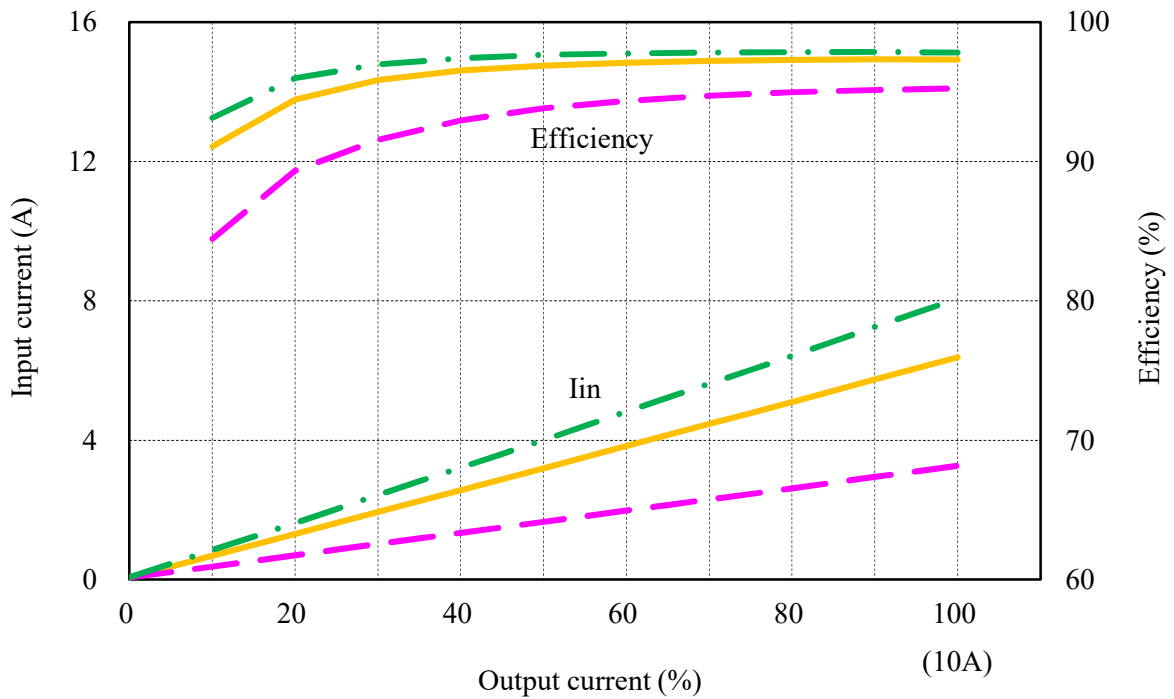
Vo=12V

Conditions Vin : 16 VDC
 : 24 VDC
 : 48 VDC
 Ta : 25 °C



Vo=15V

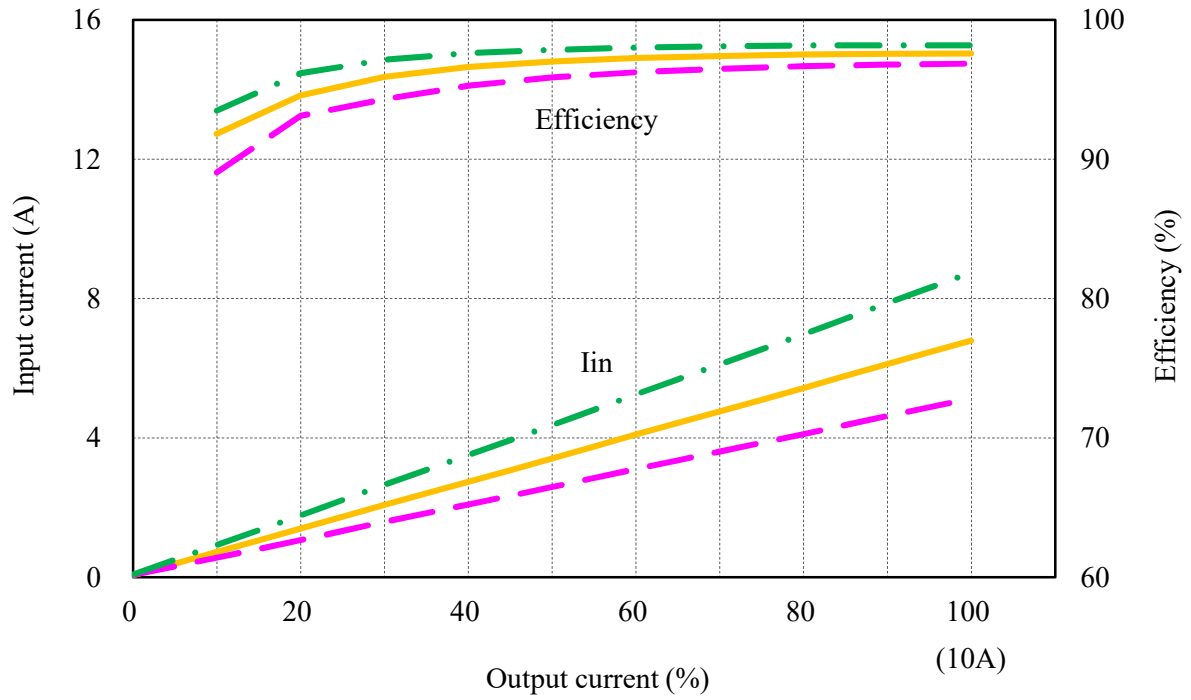
Conditions Vin : 19 VDC
 : 24 VDC
 : 48 VDC
 Ta : 25 °C



(3) 入力電流・効率 対 出力電流 Input current and Efficiency vs. Output current

$V_o=24V$

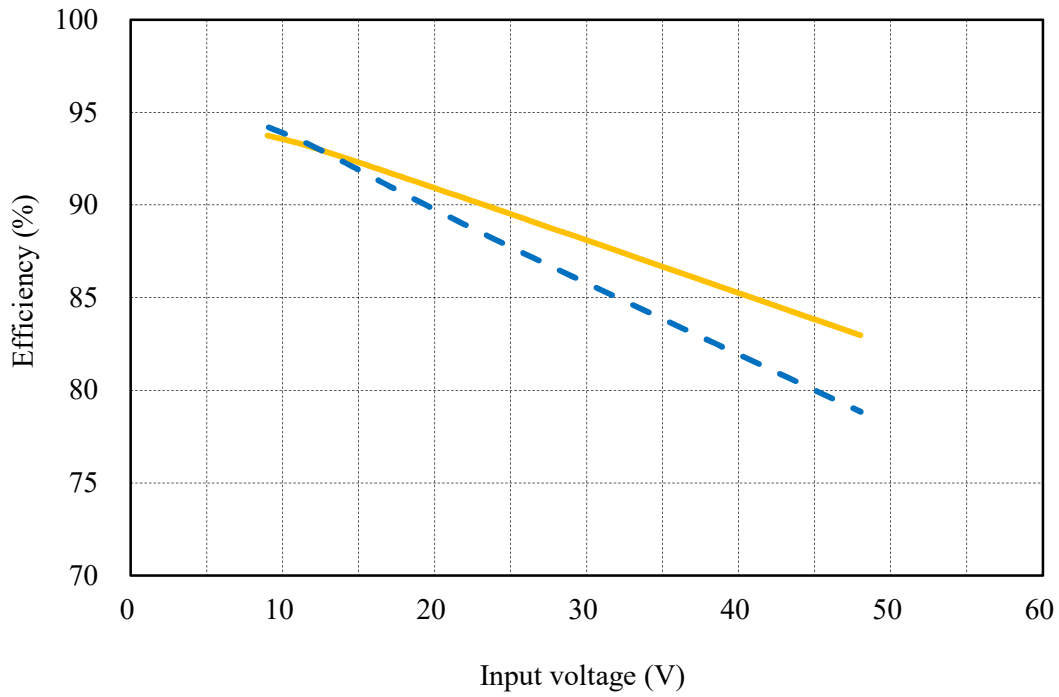
Conditions V_{in} : 28 VDC
 : 36 VDC
 : 48 VDC
 T_a : 25 °C



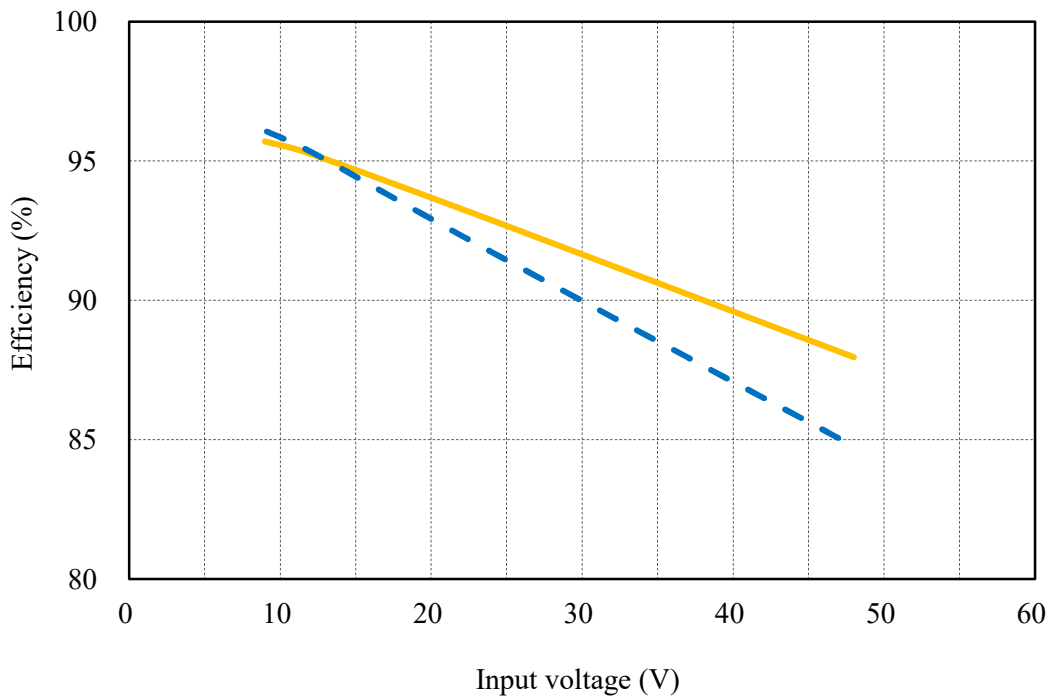
(4) 効率 対 入力電圧 Efficiency vs. Input voltage

Conditions I_o : 50 % - - - -
 : 100 % ————
 T_a : 25 °C

V_o=3.3V



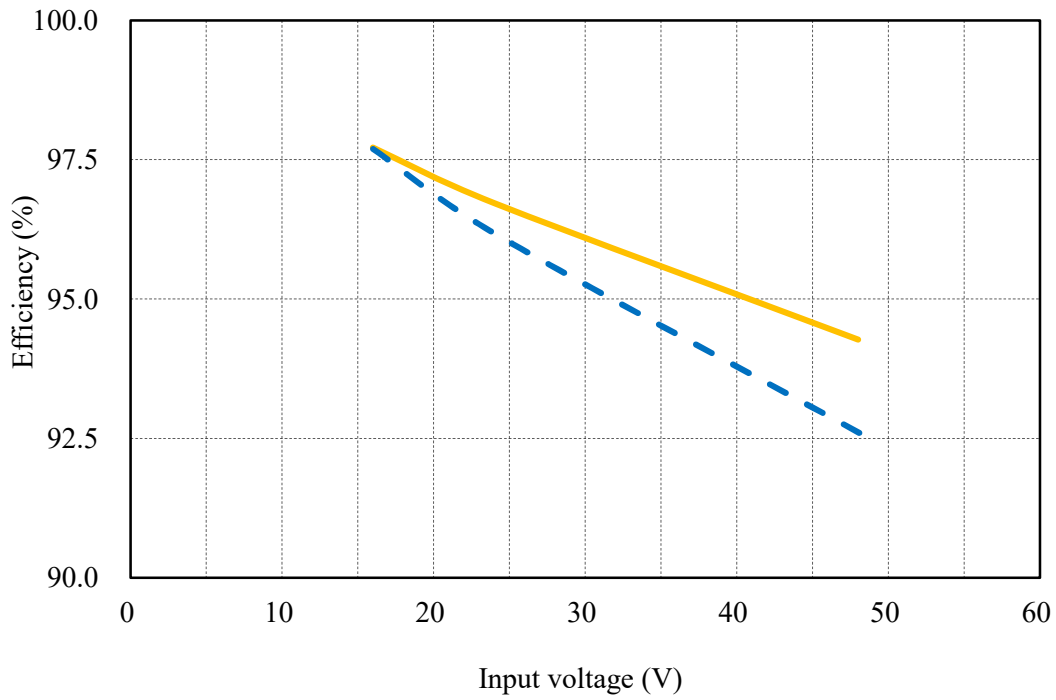
V_o=5V



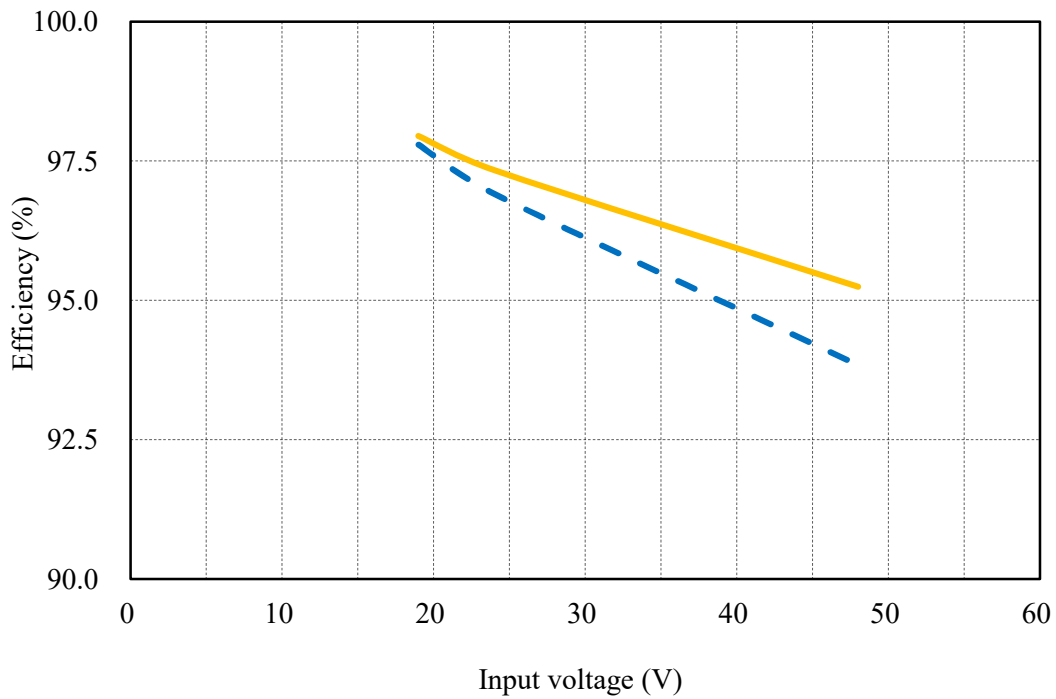
(4) 効率 対 入力電圧 Efficiency vs. Input voltage

Conditions I_o : 50 % - - - -
 : 100 % ————
 T_a : 25 °C

V_o=12V



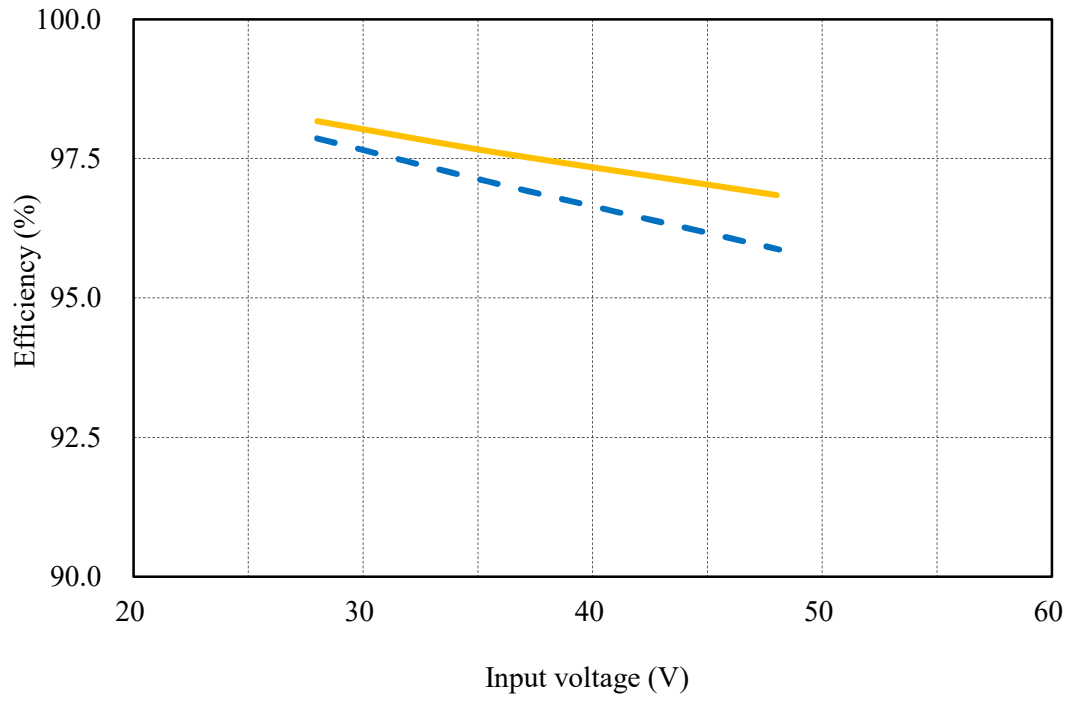
V_o=15V



(4) 効率 対 入力電圧 Efficiency vs. Input voltage

Conditions Io : 50 % - - - -
 : 100 % ————
 Ta : 25 °C

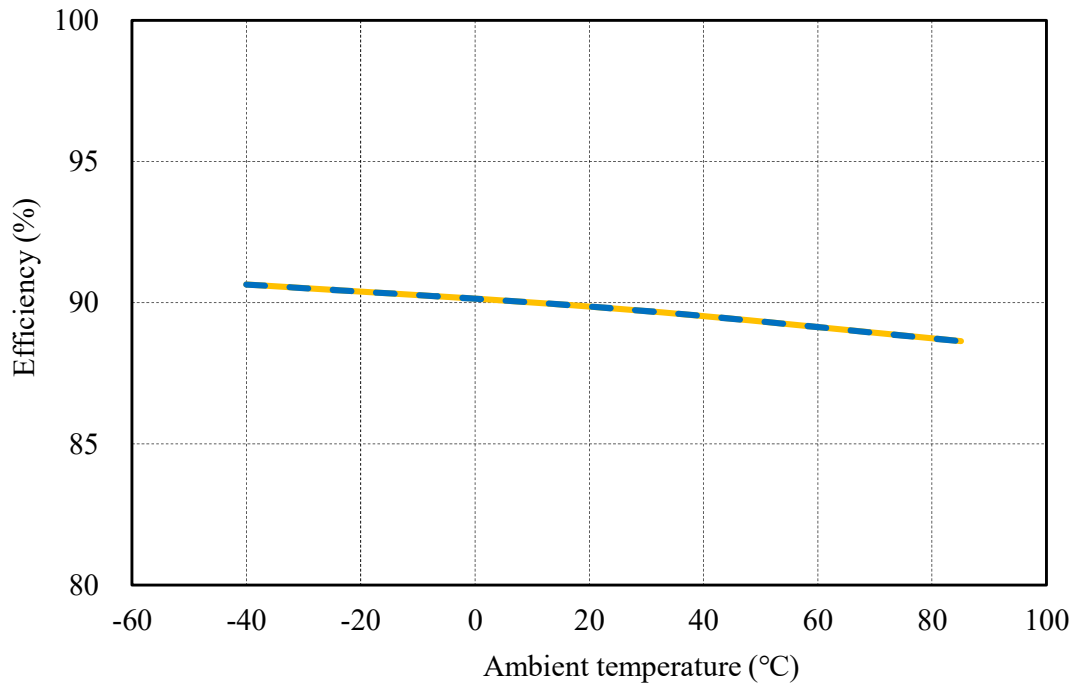
Vo=24V



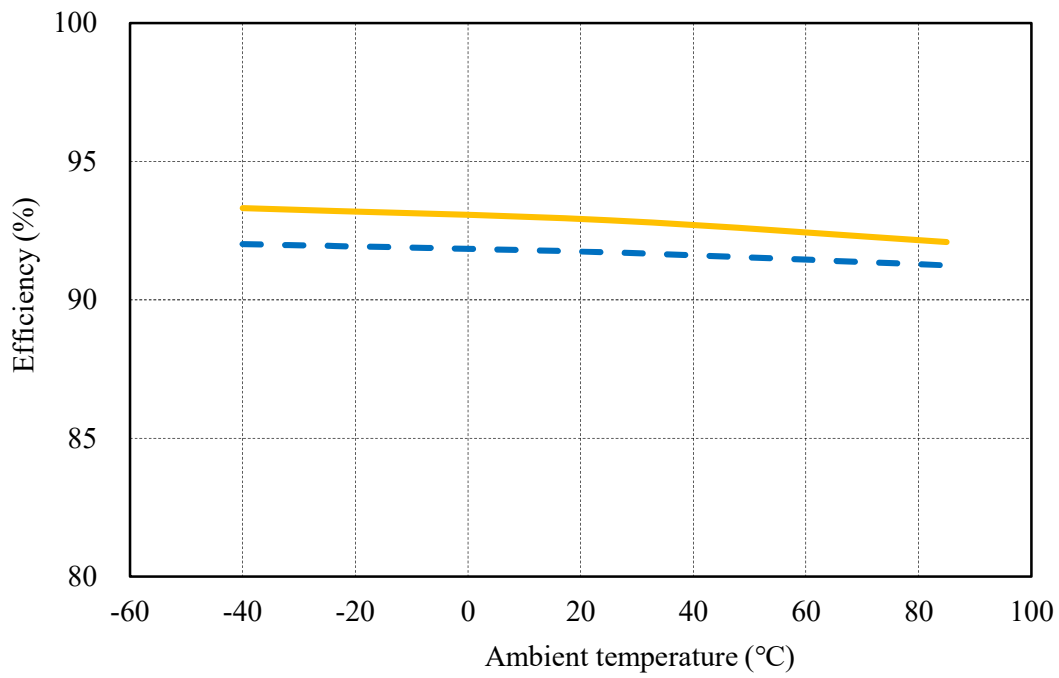
(5) 效率 对 温度 Efficiency vs. Temperature

Conditions V_{in} : 24 V
 I_o : 50 % - - - -
 : 100 % —————

$V_o=3.3V$



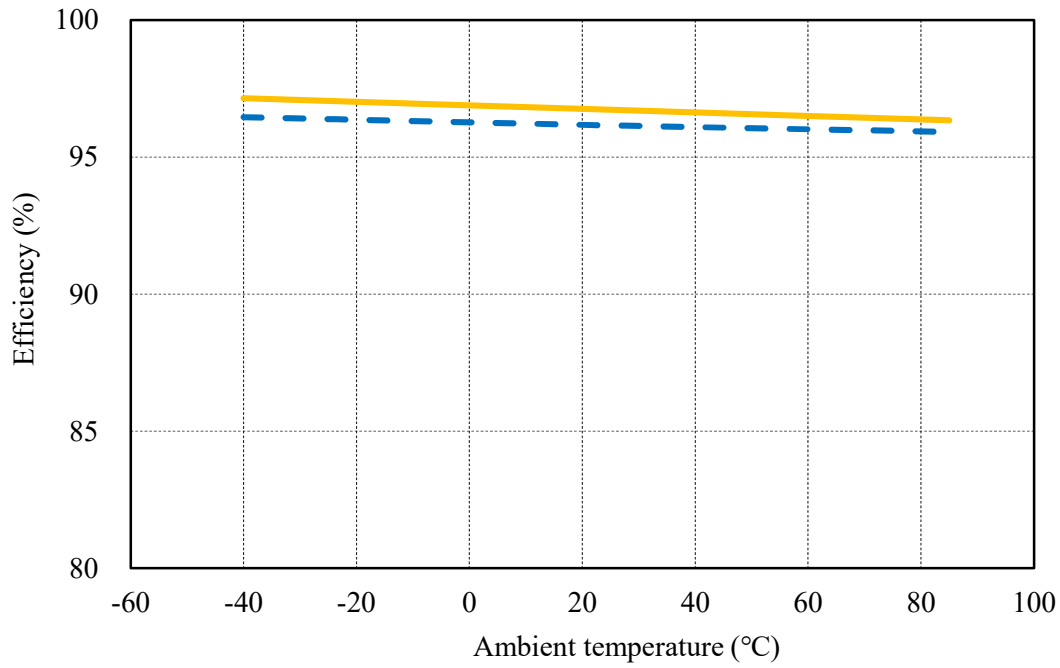
$V_o=5V$



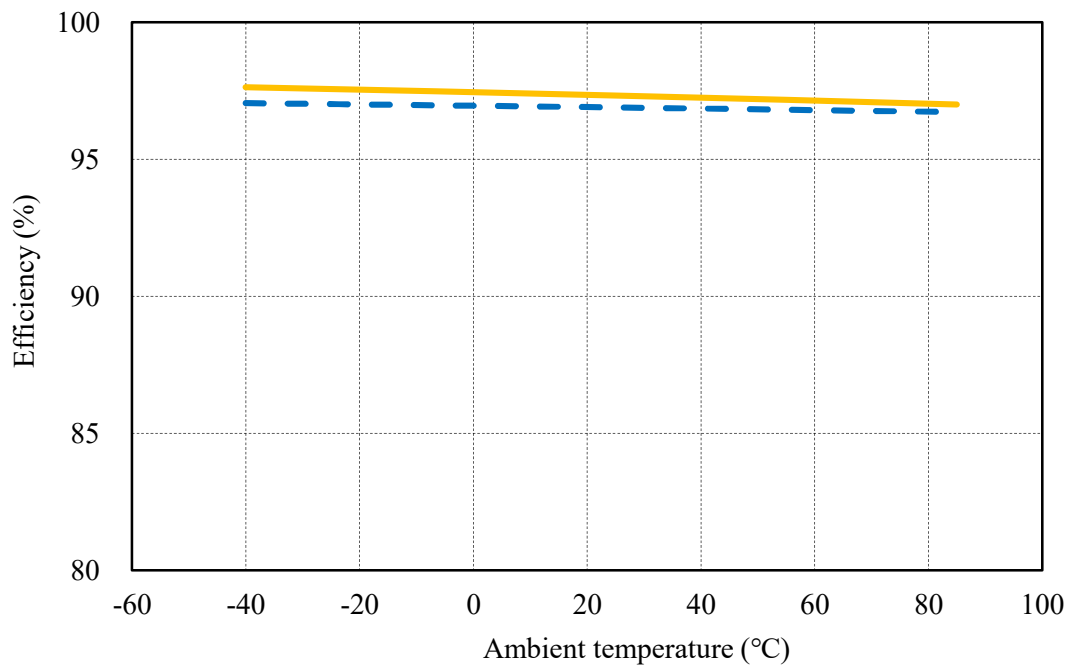
(5) 効率 対 温度 Efficiency vs. Temperature

Conditions V_{in} : 24 V
 I_o : 50 % - - - -
 : 100 % —————

$V_o=12V$



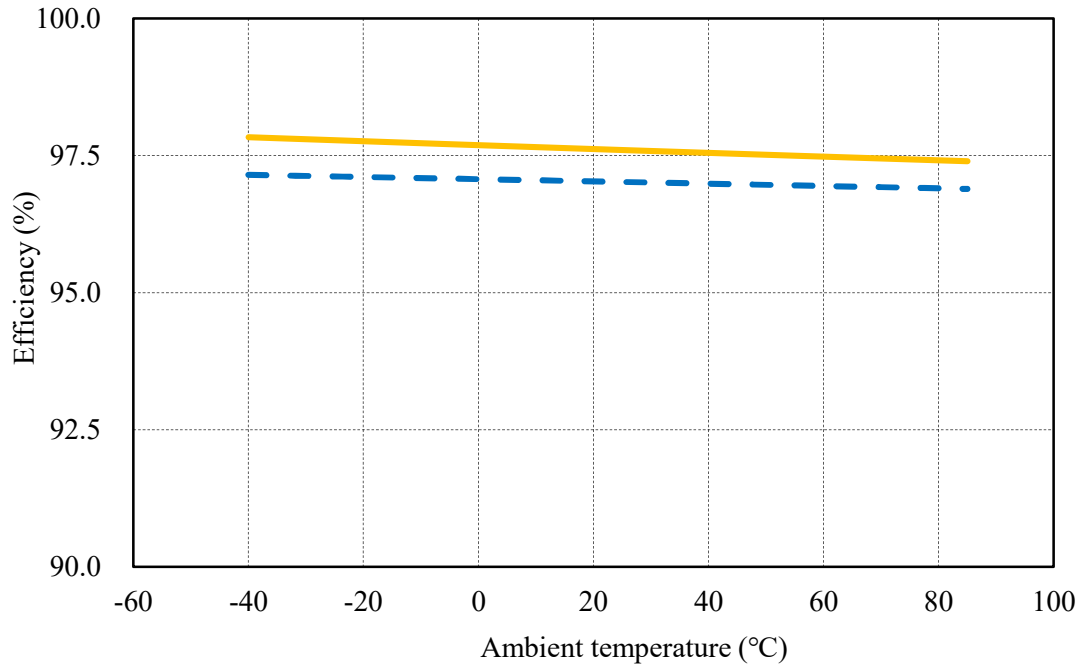
$V_o=15V$



(5) 效率 对 温度 Efficiency vs. Temperature

Conditions Vin : 36 V
Io : 50 % - - - -
 : 100 % —————

Vo=24V



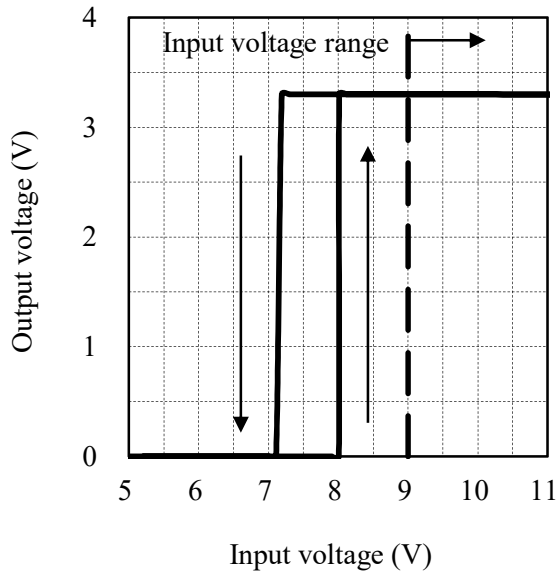
(6) 起動・遮断電圧特性 Start up and Drop out voltage characteristics

出力電圧 対 入力電圧

Output voltage vs. Input voltage

Conditions I_o : 100 %
 T_a : 25 °C

$V_o=3.3V$

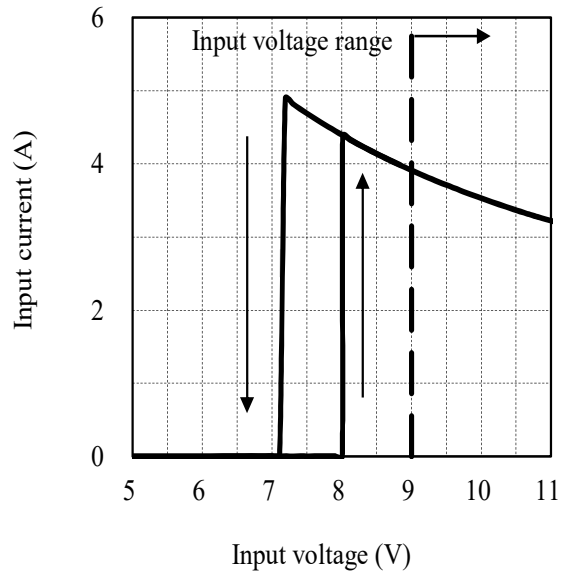


入力電流 対 入力電圧

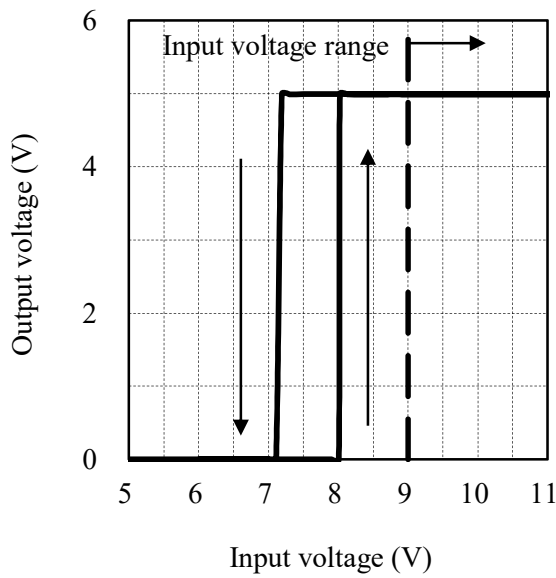
Input current vs. Input voltage

Conditions I_o : 100 %
 T_a : 25 °C

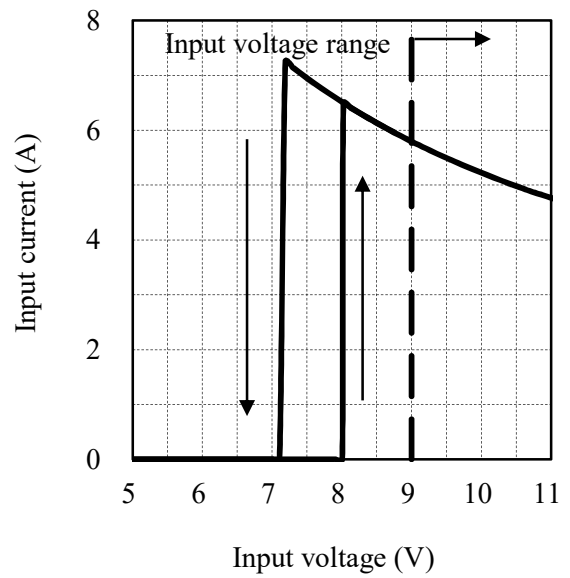
$V_o=3.3V$



$V_o=5V$



$V_o=5V$



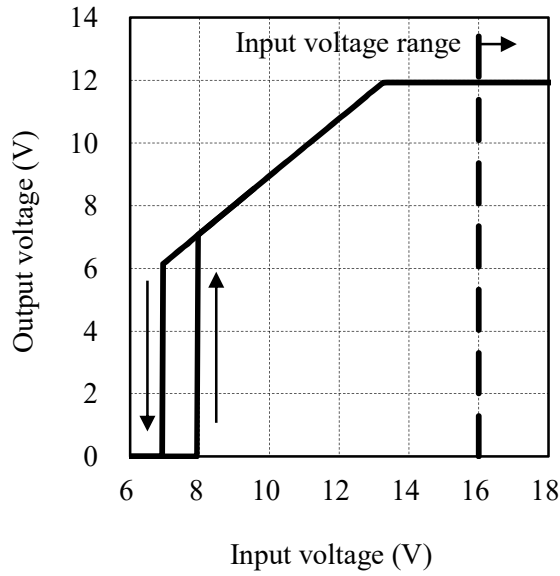
(6) 起動・遮断電圧特性 Start up and Drop out voltage characteristics

出力電圧 対 入力電圧

Output voltage vs. Input voltage

Conditions I_o : 100 %
 T_a : 25 °C

$V_o=12V$

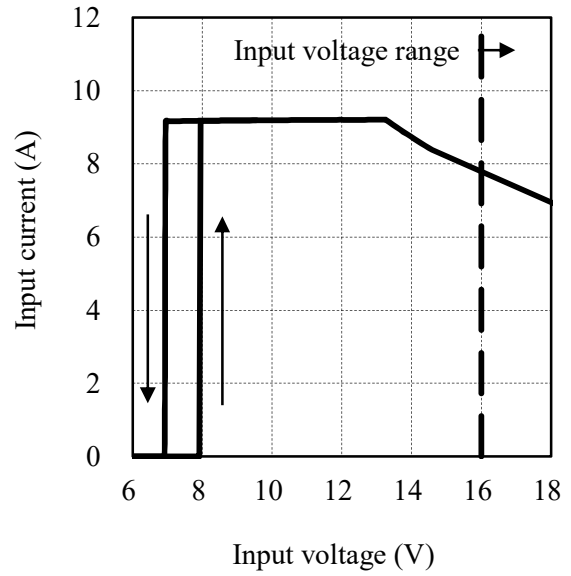


入力電流 対 入力電圧

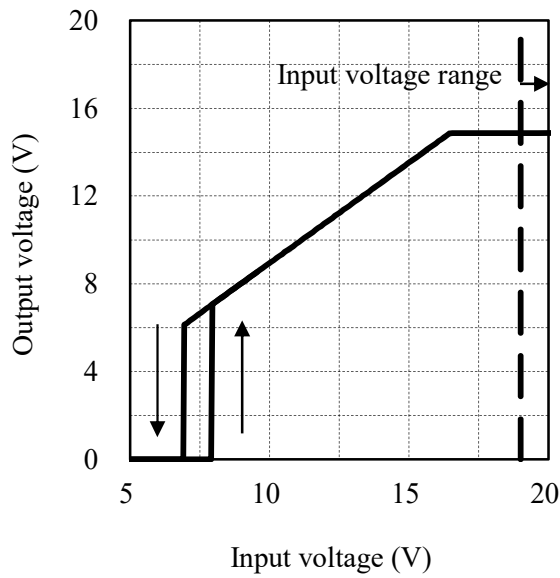
Input current vs. Input voltage

Conditions I_o : 100 %
 T_a : 25 °C

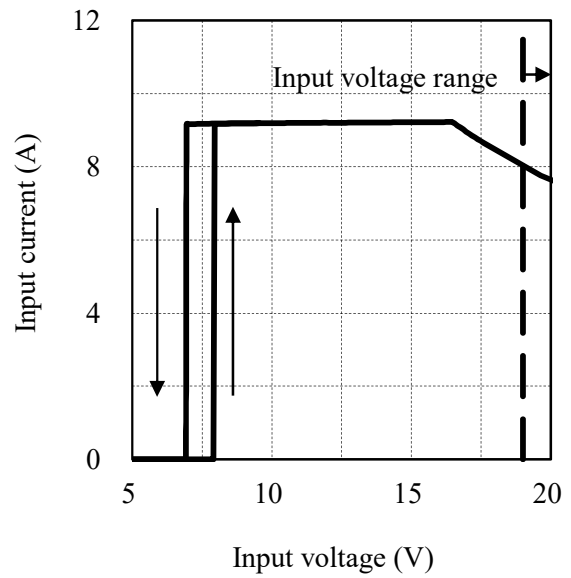
$V_o=12V$



$V_o=15V$



$V_o=15V$

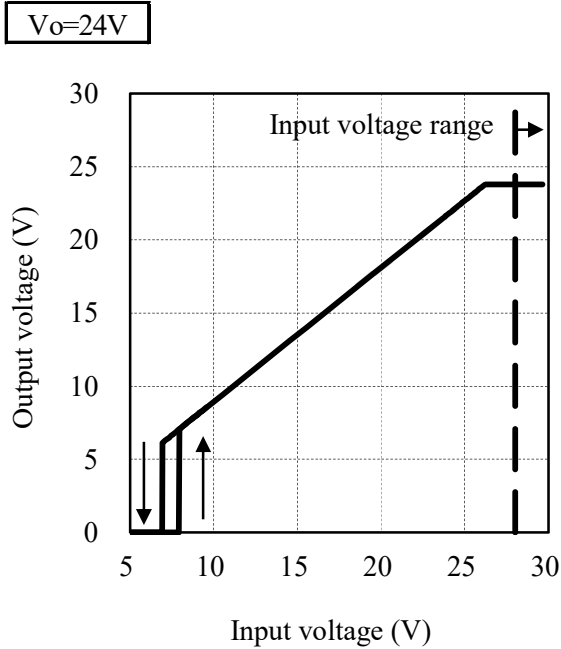


(6) 起動・遮断電圧特性 Start up and Drop out voltage characteristics

出力電圧 対 入力電圧

Output voltage vs. Input voltage

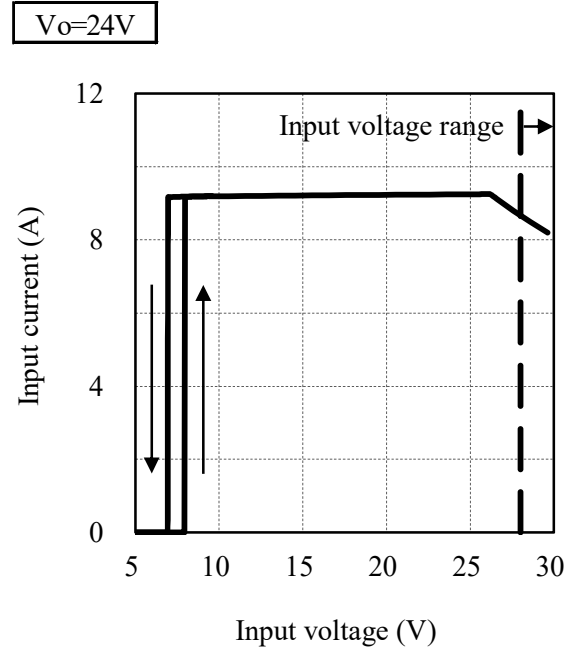
Conditions I_o : 100 %
 T_a : 25 °C



入力電流 対 入力電圧

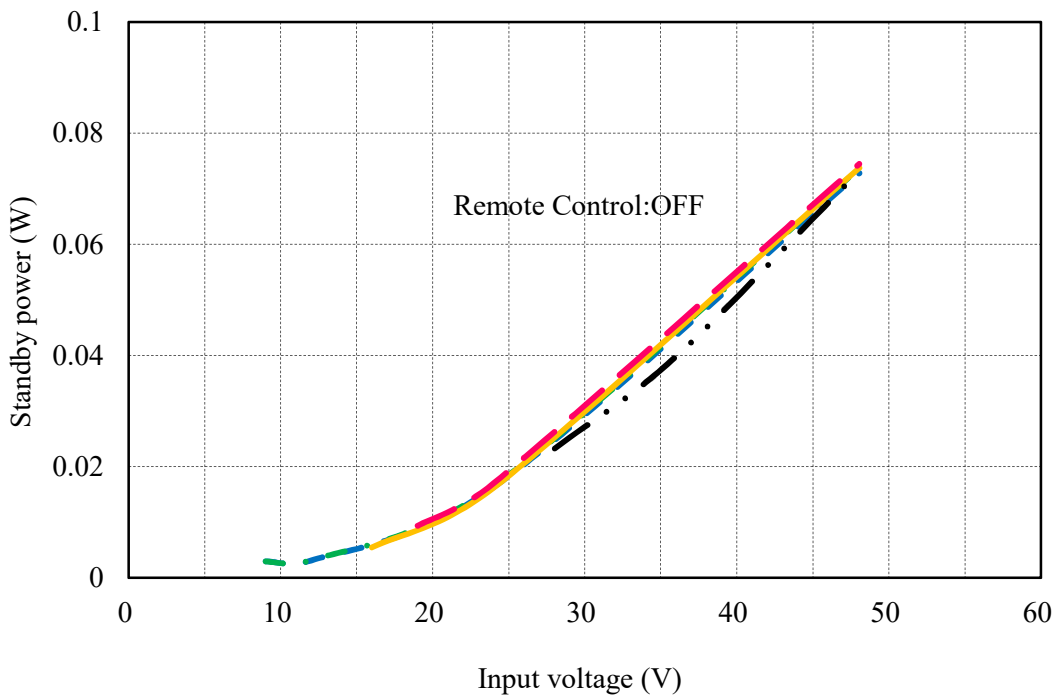
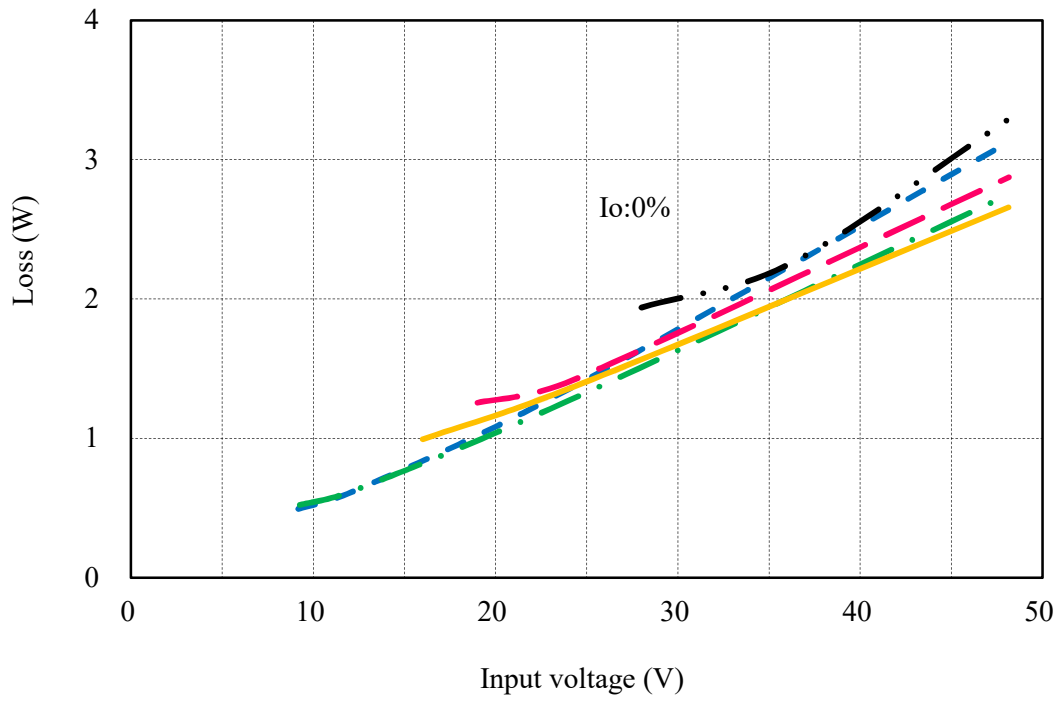
Input current vs. Input voltage

Conditions I_o : 100 %
 T_a : 25 °C



2-2. 待機電力特性 Standby power characteristics

Conditions Vo : 3.3 VDC - - -
 : 5 VDC - · -
 : 12 VDC ———
 : 15 VDC - - -
 : 24 VDC - · -
 Ta : 25 °C



2-3. 過電流保護特性 Over current protection (OCP) characteristics

入力電圧依存性

Input voltage dependence

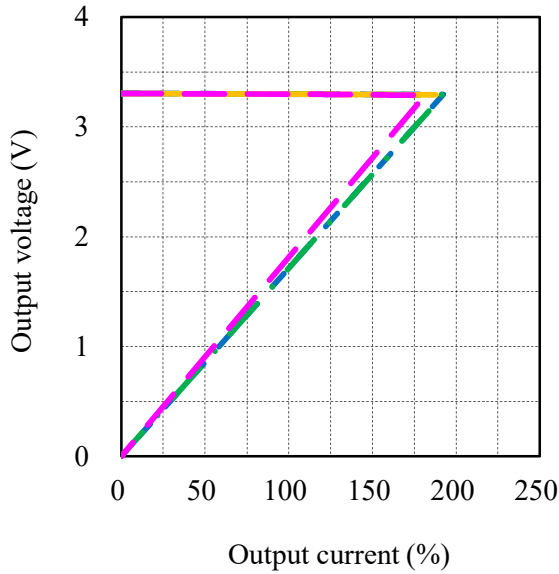
Conditions Vin : 9 VDC — — — —
 : 12 VDC - · - · -
 : 24 VDC —————
 : 48 VDC ————
 Ta : 25 °C

周囲温度依存性

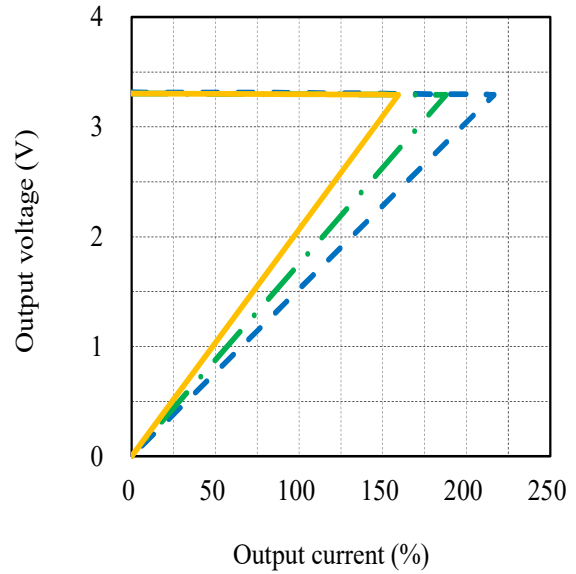
Ambient temperature dependence

Conditions Vin : 24 VDC
 Ta : -40 °C — — — —
 : 25 °C - · - · -
 : 85 °C —————

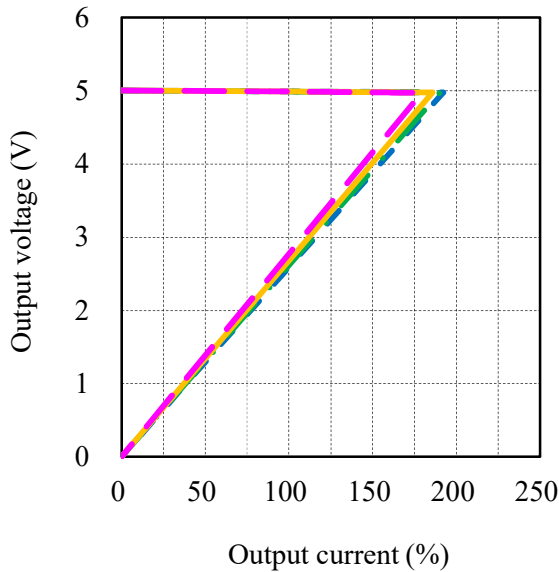
Vo=3.3V



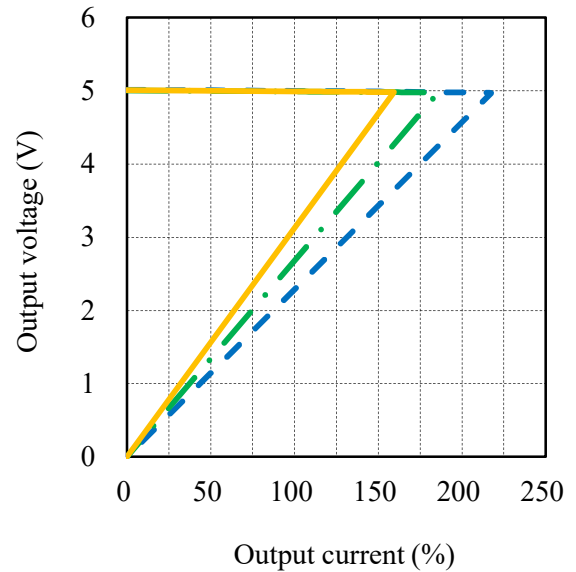
Vo=3.3V



Vo=5V



Vo=5V



2-3. 過電流保護特性 Over current protection (OCP) characteristics

入力電圧依存性

Input voltage dependence

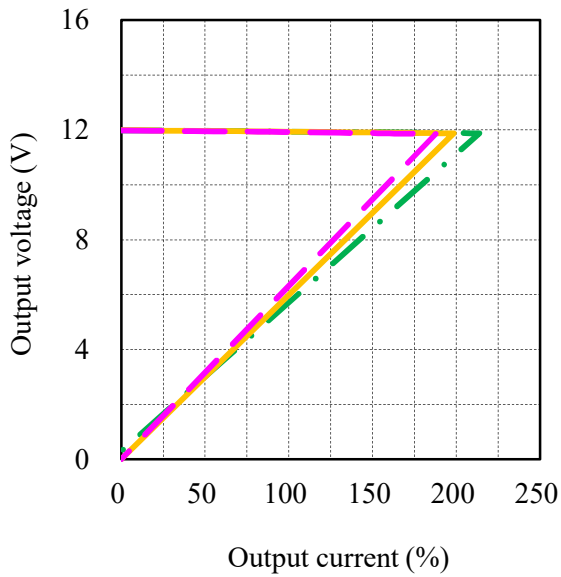
Conditions Vin : 16 VDC — — — —
 : 24 VDC — — — —
 : 48 VDC — — — —
 Ta : 25 °C

周囲温度依存性

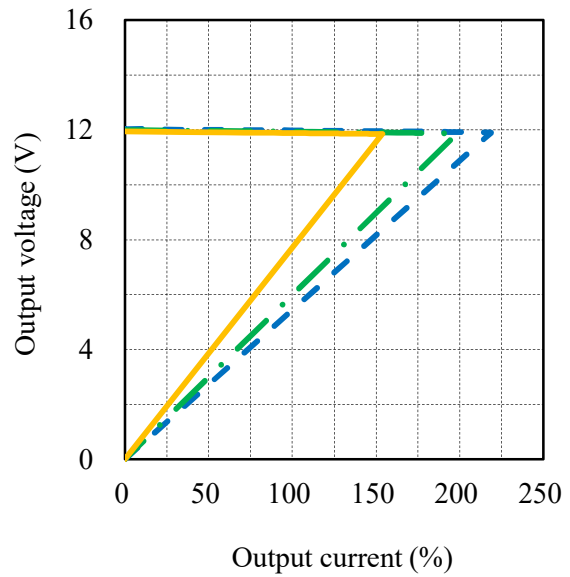
Ambient temperature dependence

Conditions Vin : 24 VDC
 Ta : -40 °C — — — —
 : 25 °C — — — —
 : 85 °C — — — —

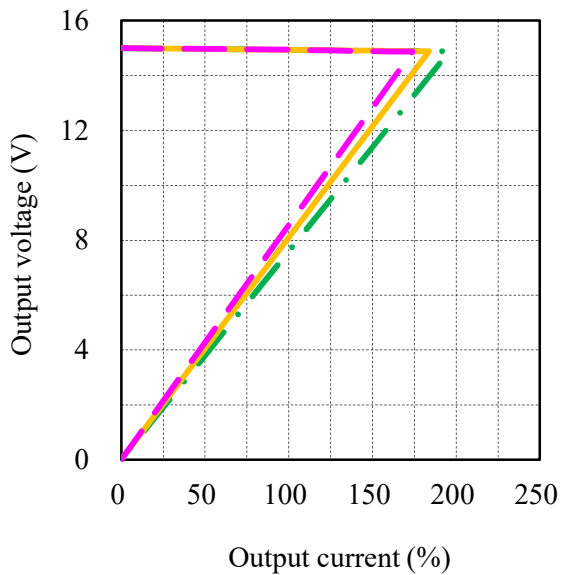
Vo=12V



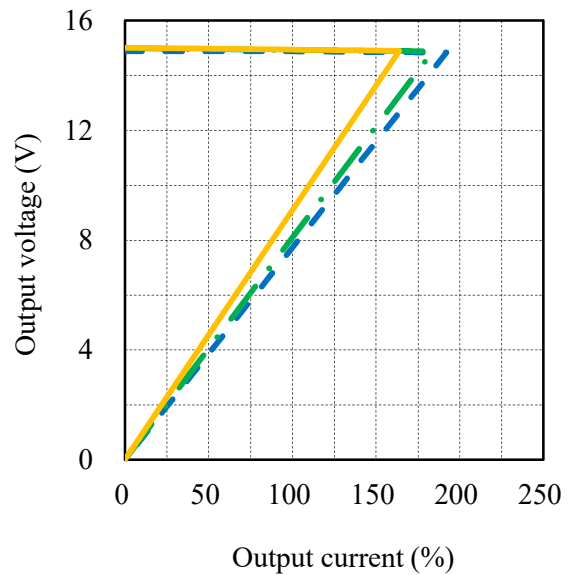
Vo=12V



Vo=15V



Vo=15V



2-3. 過電流保護特性 Over current protection (OCP) characteristics

入力電圧依存性

Input voltage dependence

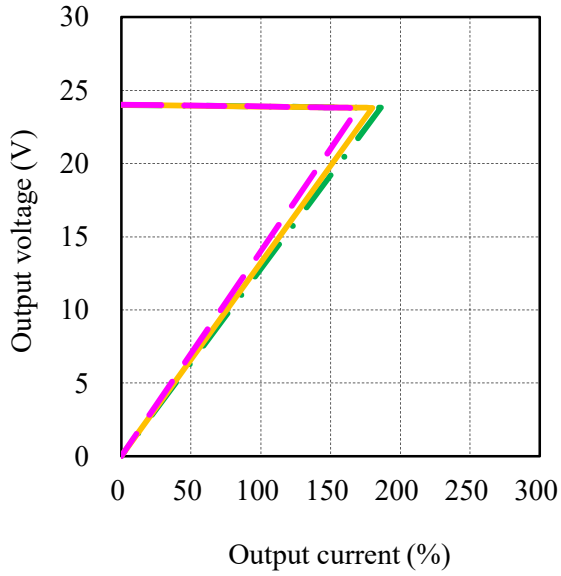
Conditions Vin : 28 VDC — — —
 : 36 VDC ———
 : 48 VDC - - - -
 Ta : 25 °C

周囲温度依存性

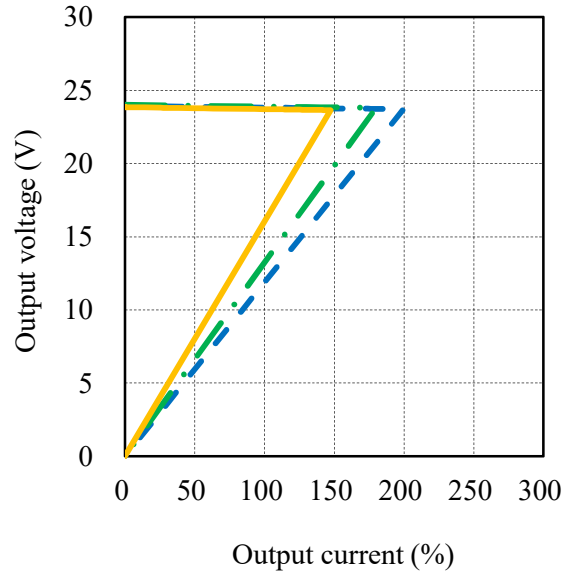
Ambient temperature dependence

Conditions Vin : 36 VDC
 Ta : -40 °C - - - -
 : 25 °C — — —
 : 85 °C ———

$V_o=24V$



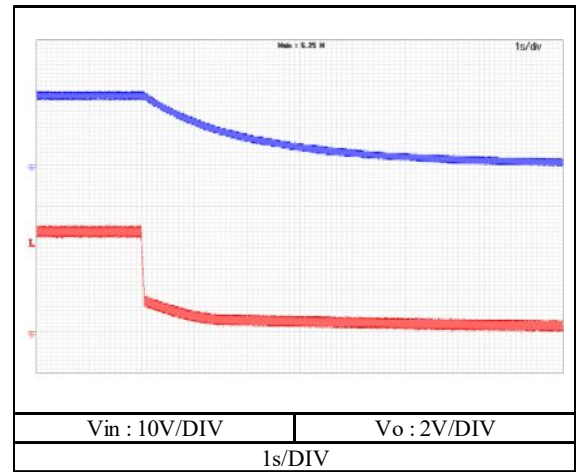
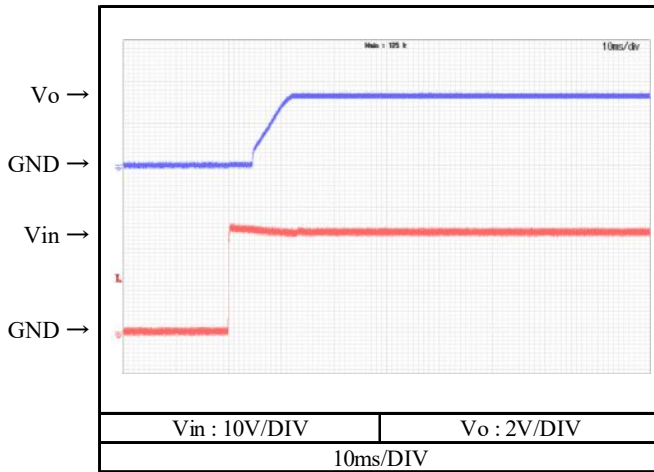
$V_o=24V$



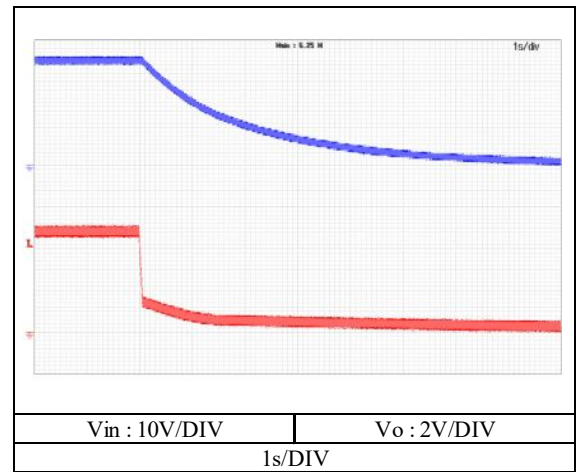
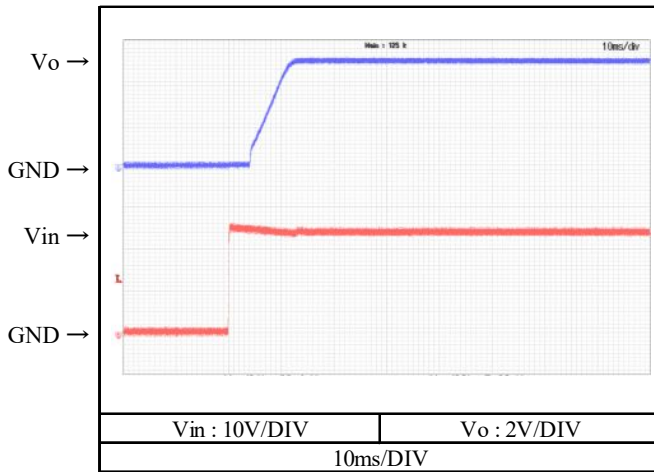
2-4. 出力立ち上がり・立ち下がり特性 Output rise and fall characteristics

Conditions Vin : 24 VDC
Io : 0 %
Ta : 25 °C

Vo=3.3V



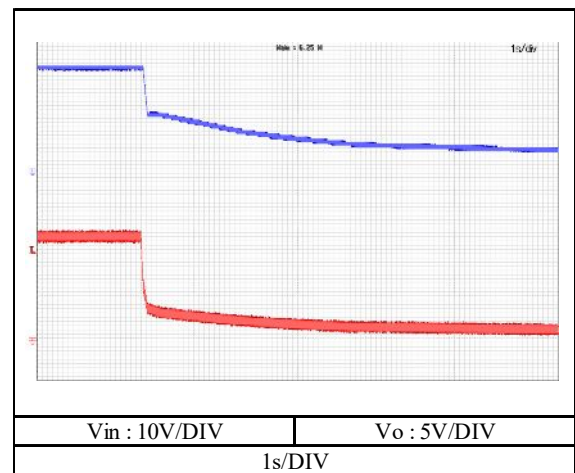
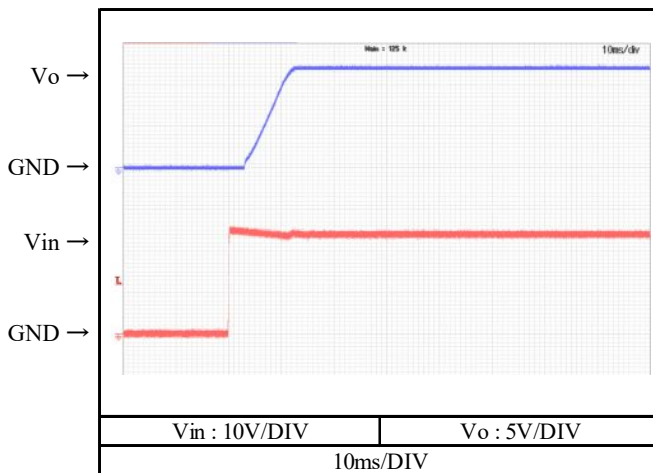
Vo=5V



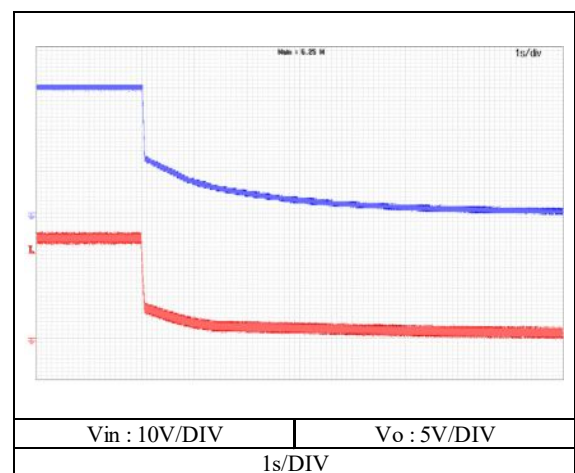
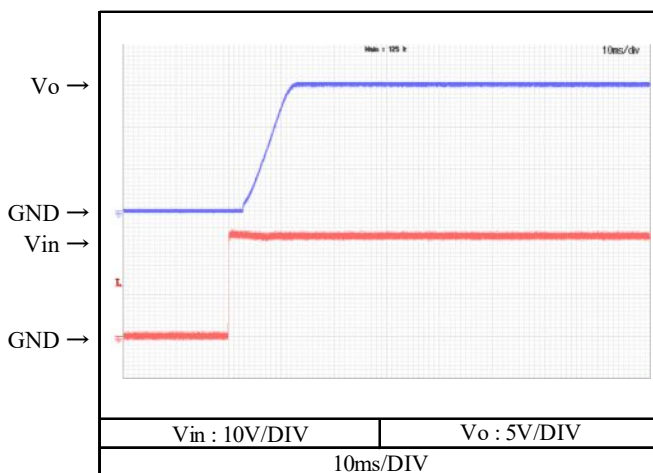
2-4. 出力立ち上がり・立ち下がり特性 Output rise and fall characteristics

Conditions Vin : 24 VDC
Io : 0 %
Ta : 25 °C

Vo=12V



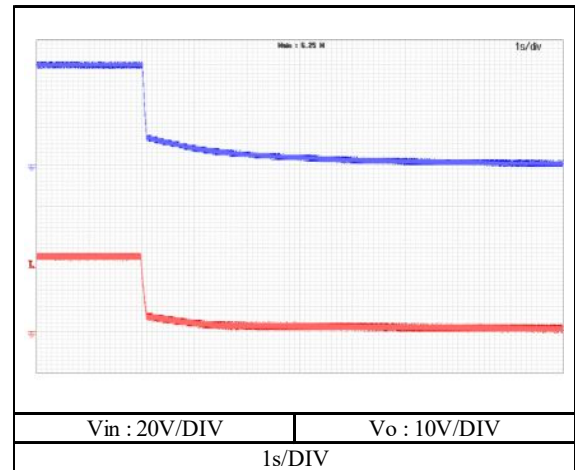
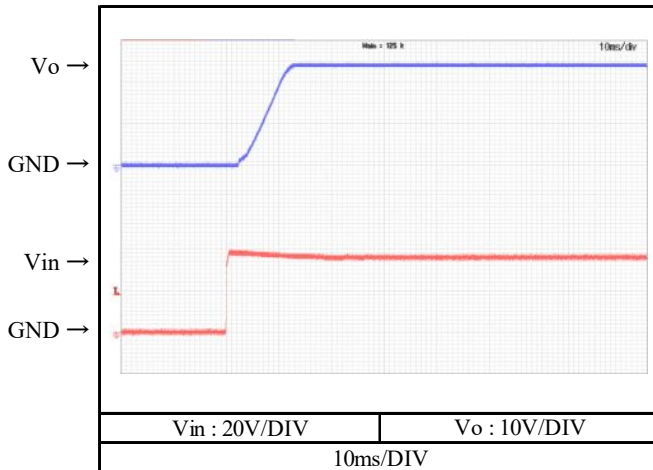
Vo=15V



2-4. 出力立ち上がり・立ち下がり特性 Output rise and fall characteristics

Conditions Vin : 36 VDC
Io : 0 %
Ta : 25 °C

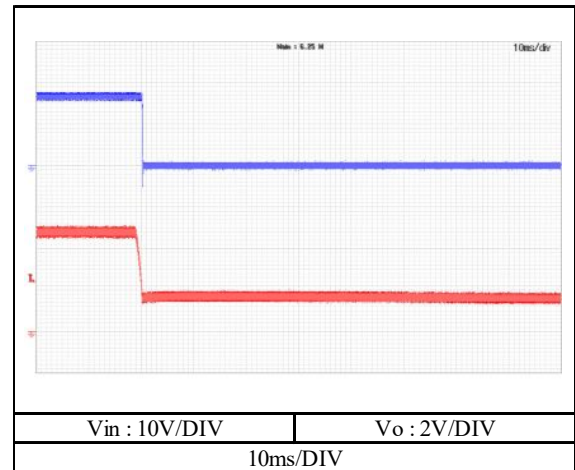
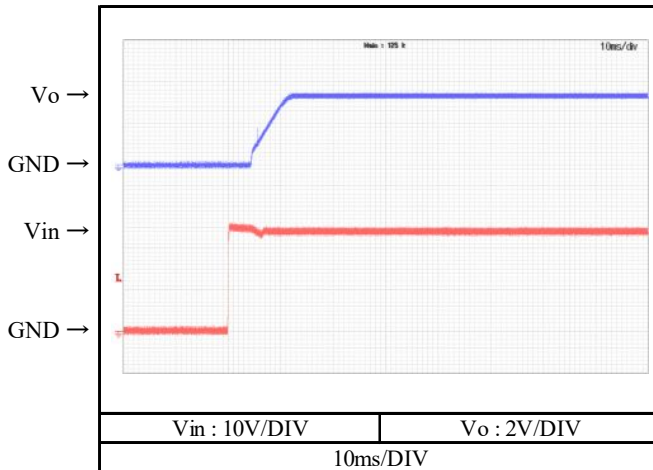
Vo=24V



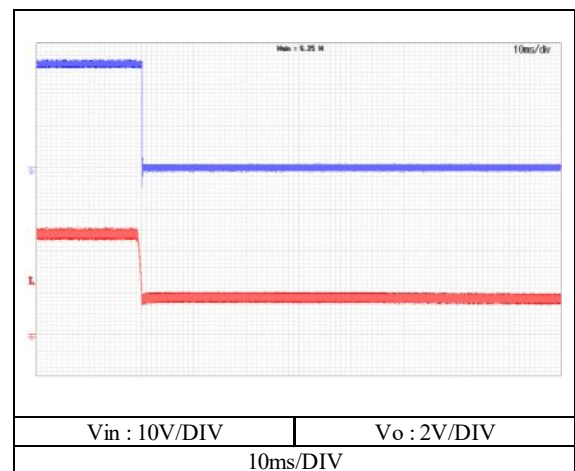
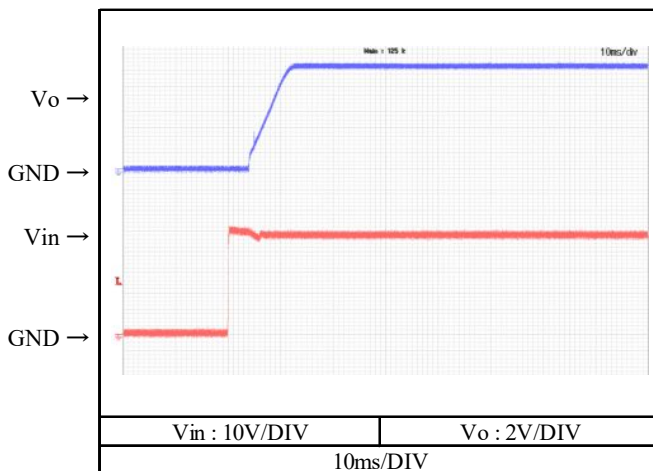
2-4. 出力立ち上がり・立ち下がり特性 Output rise and fall characteristics

Conditions V_{in} : 24 VDC
 I_o : 100 %
 T_a : 25 °C

$V_o=3.3V$



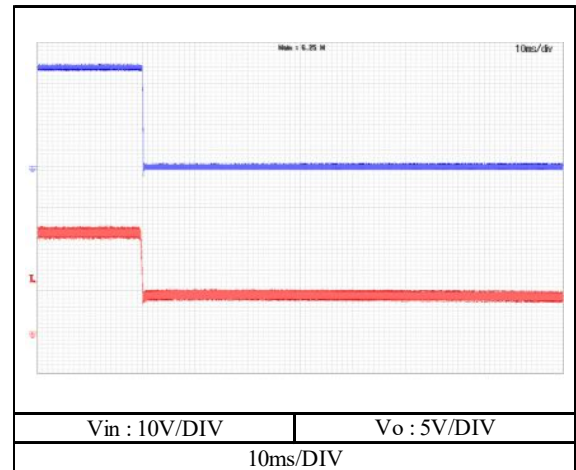
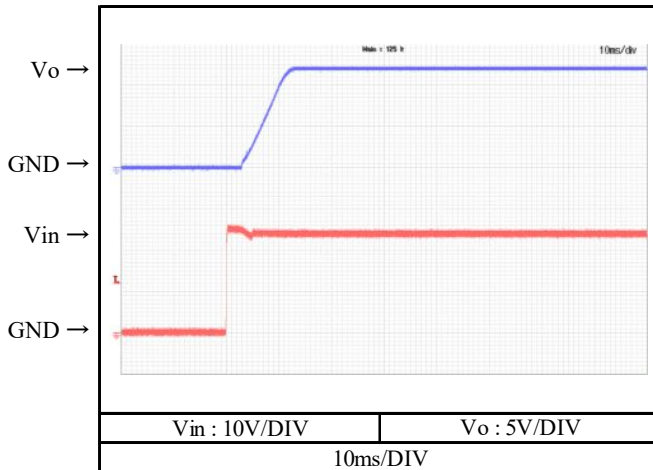
$V_o=5V$



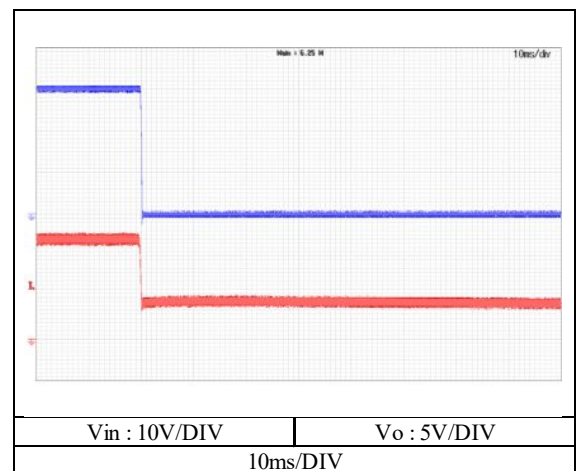
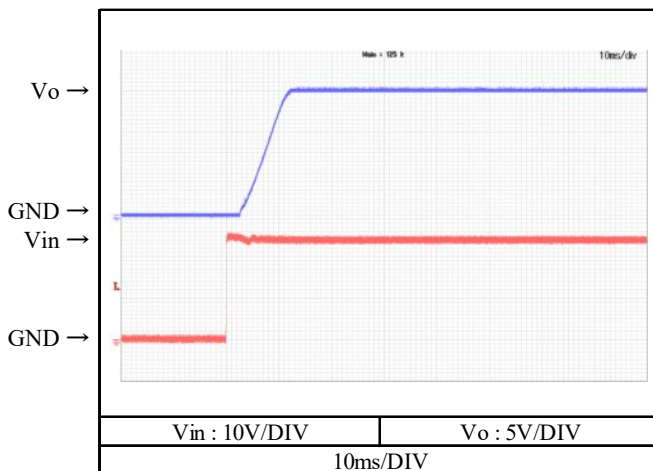
2-4. 出力立ち上がり・立ち下がり特性 Output rise and fall characteristics

Conditions V_{in} : 24 VDC
 I_o : 100 %
 T_a : 25 °C

$V_o=12V$



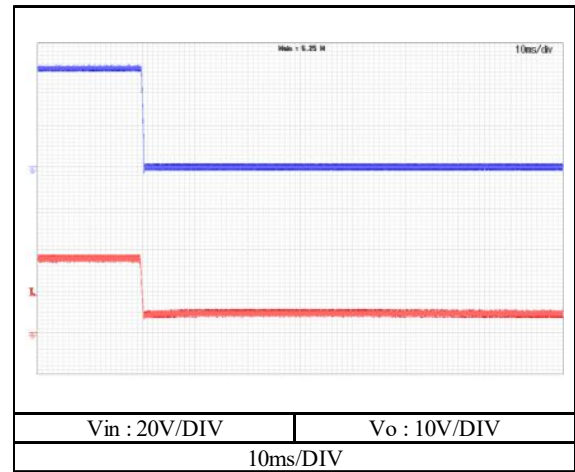
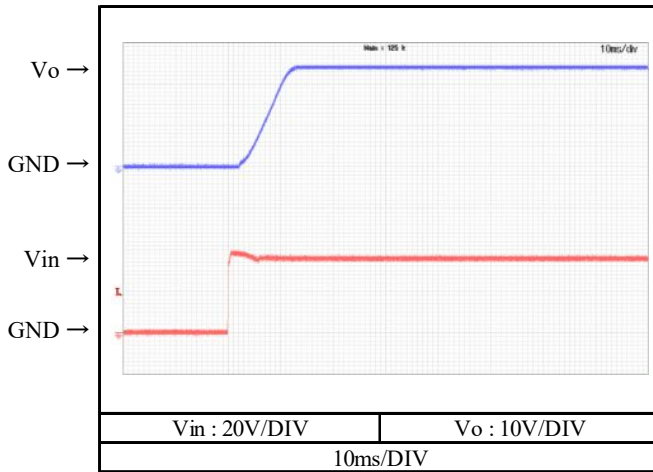
$V_o=15V$



2-4. 出力立ち上がり・立ち下がり特性 Output rise and fall characteristics

Conditions Vin : 36 VDC
Io : 100 %
Ta : 25 °C

Vo=24V



2-4. 出力立ち上がり・立ち下がり特性 (リモートON/OFFコントロール時)

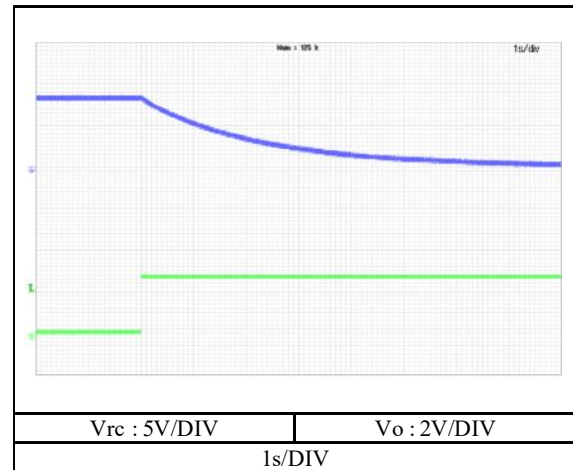
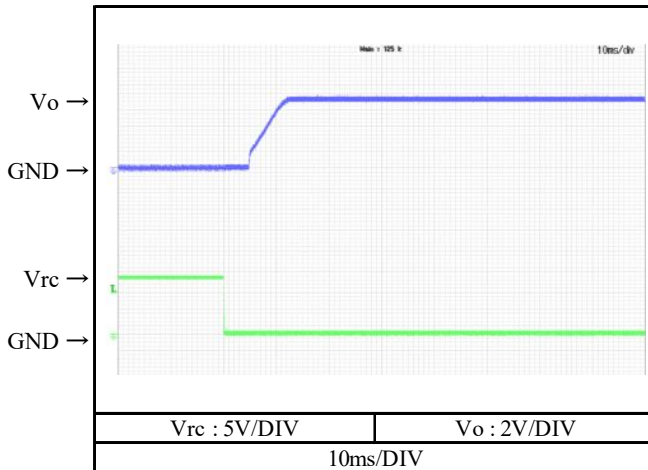
Output rise and fall characteristics with REMOTE ON/OFF CONTROL

Conditions V_{in} : 24 VDC

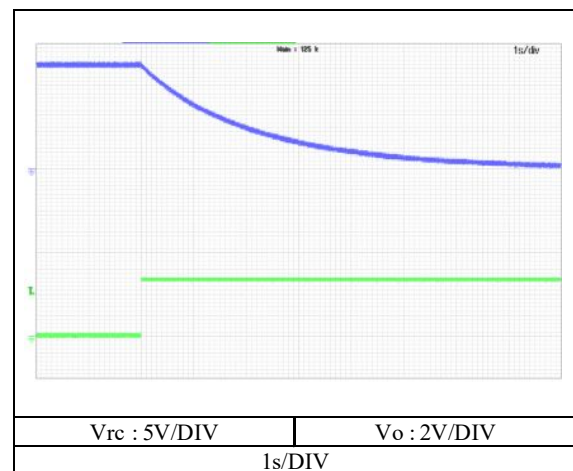
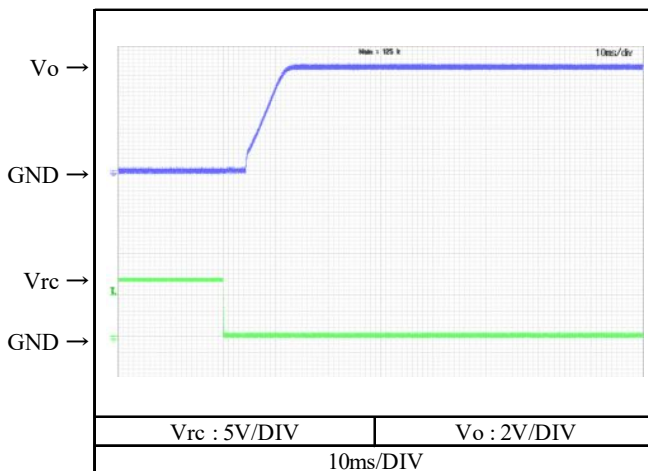
I_o : 0 %

T_a : 25 °C

$V_o=3.3V$



$V_o=5V$



2-4. 出力立ち上がり・立ち下がり特性 (リモートON/OFFコントロール時)

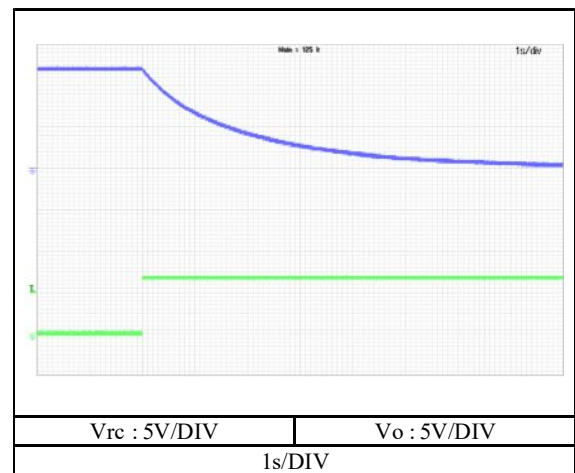
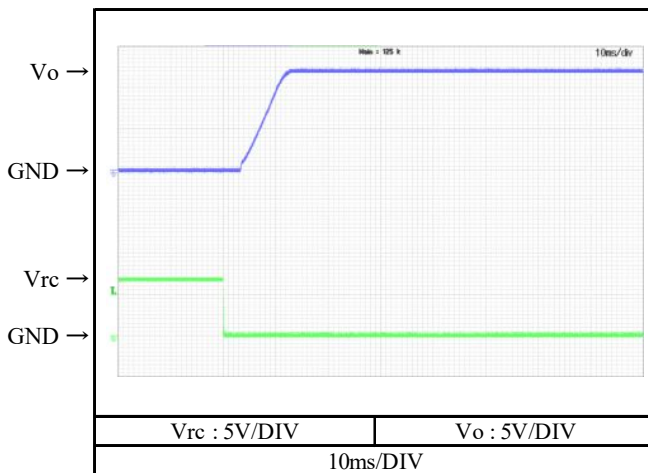
Output rise and fall characteristics with REMOTE ON/OFF CONTROL

Conditions V_{in} : 24 VDC

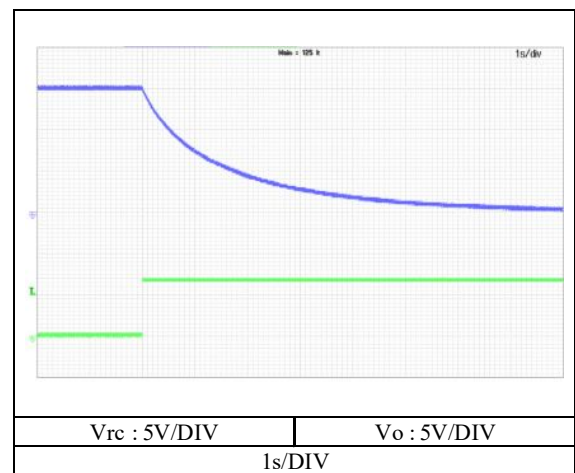
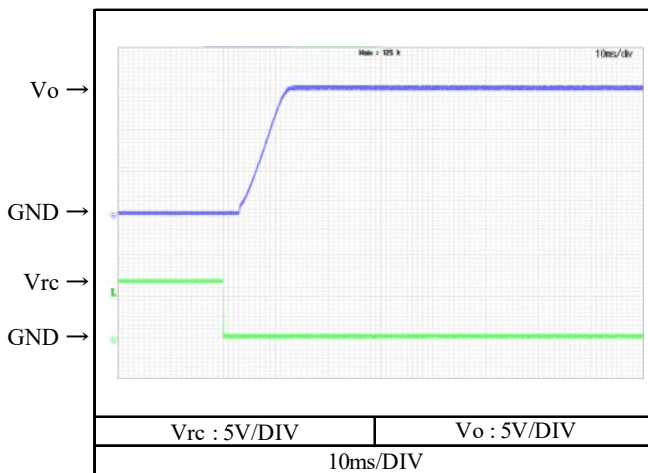
I_o : 0 %

T_a : 25 °C

$V_o=12V$



$V_o=15V$

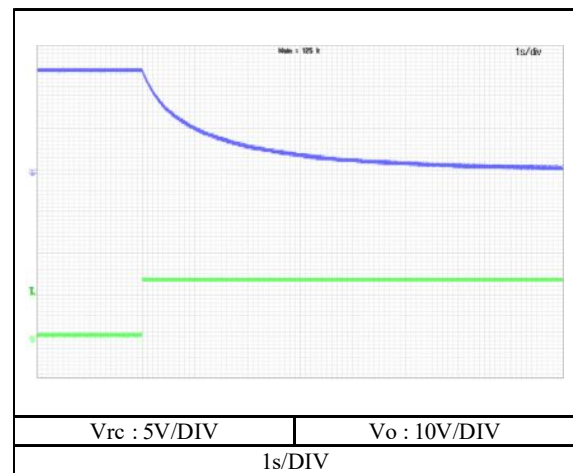
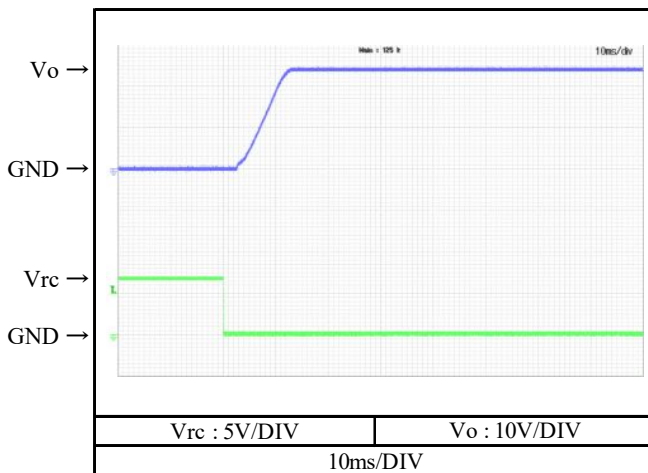


2-4. 出力立ち上がり・立ち下がり特性 (リモートON/OFFコントロール時)

Output rise and fall characteristics with REMOTE ON/OFF CONTROL

Conditions Vin : 36 VDC
Io : 0 %
Ta : 25 °C

Vo=24V



2-4. 出力立ち上がり・立ち下がり特性 (リモートON/OFFコントロール時)

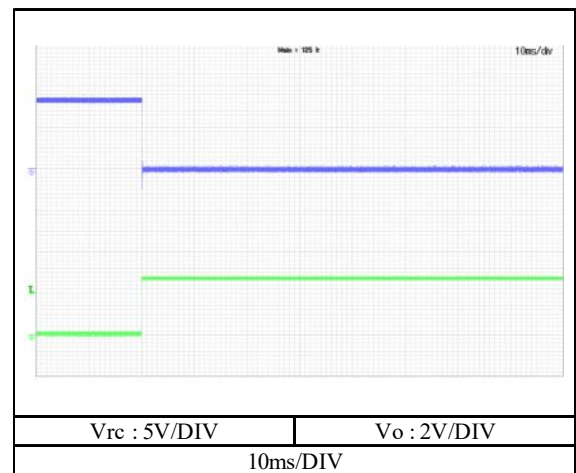
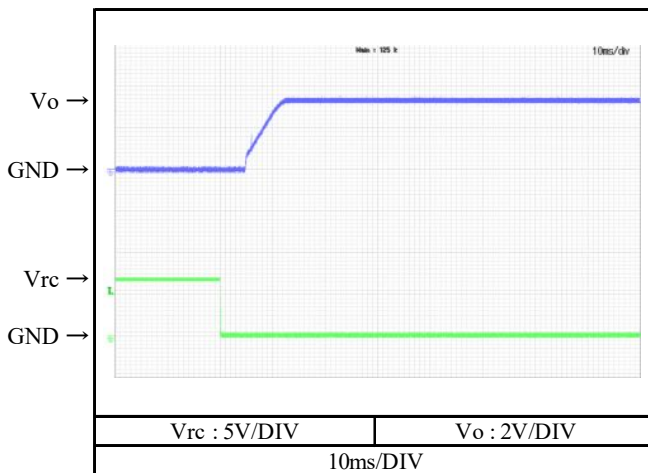
Output rise and fall characteristics with REMOTE ON/OFF CONTROL

Conditions V_{in} : 24 VDC

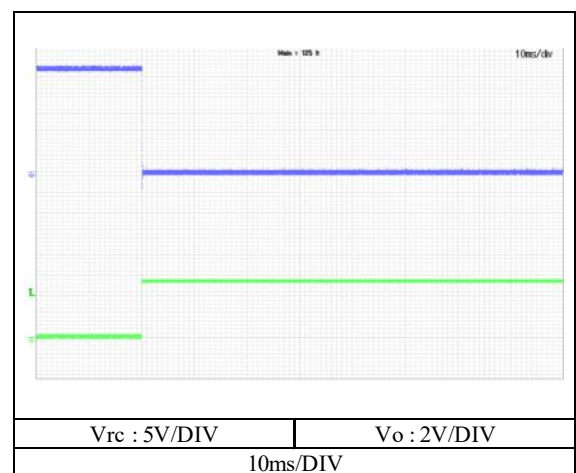
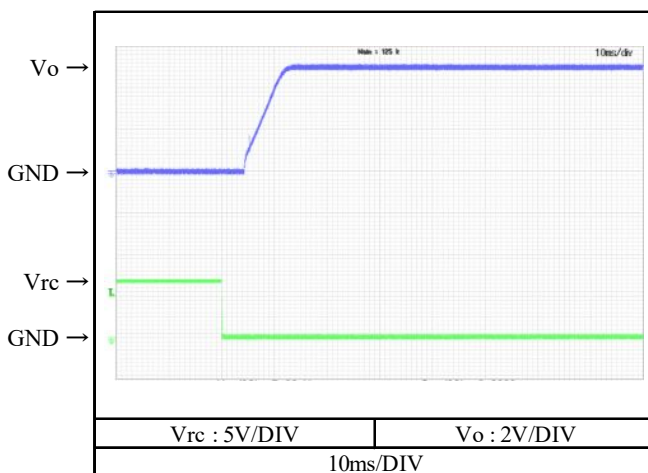
I_o : 100 %

T_a : 25 °C

$V_o=3.3V$



$V_o=5V$



2-4. 出力立ち上がり・立ち下がり特性 (リモートON/OFFコントロール時)

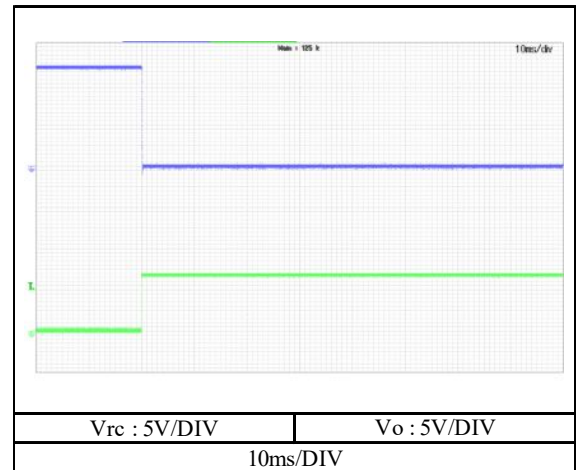
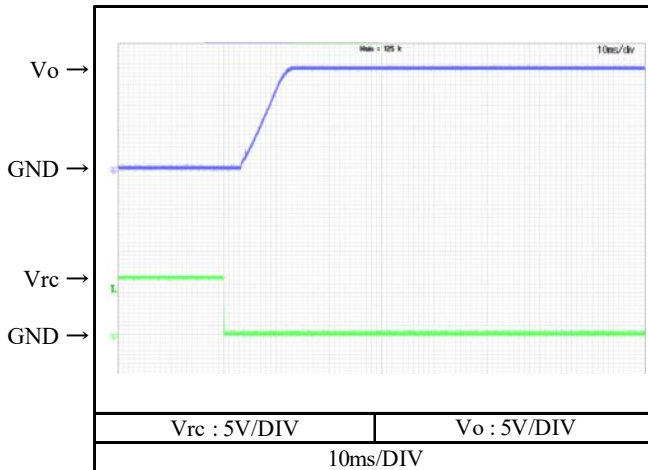
Output rise and fall characteristics with REMOTE ON/OFF CONTROL

Conditions V_{in} : 24 VDC

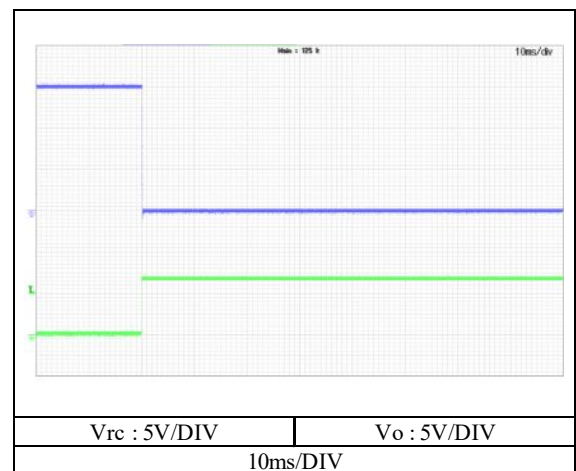
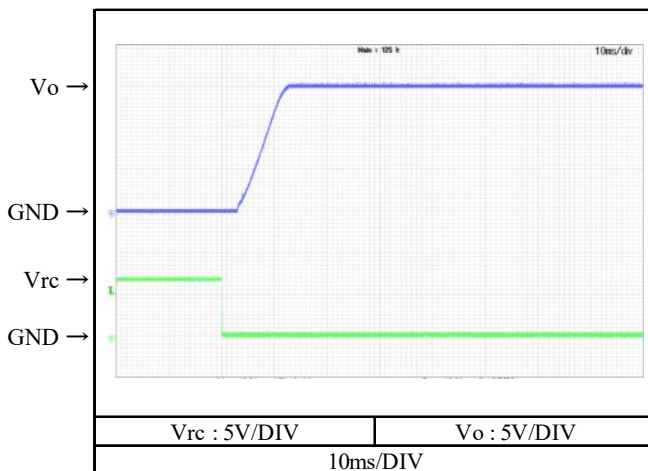
I_o : 100 %

T_a : 25 °C

$V_o=12V$



$V_o=15V$



2-4. 出力立ち上がり・立ち下がり特性 (リモートON/OFFコントロール時)

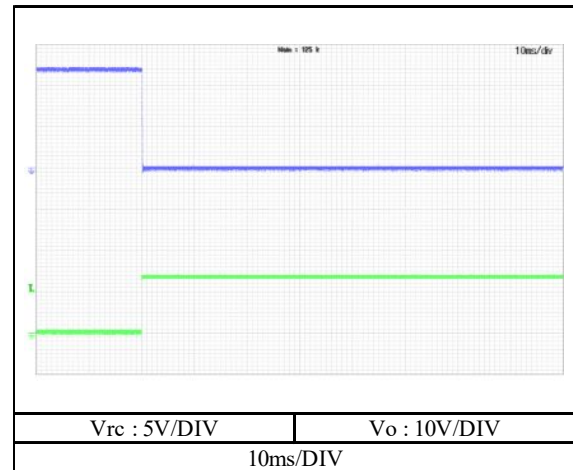
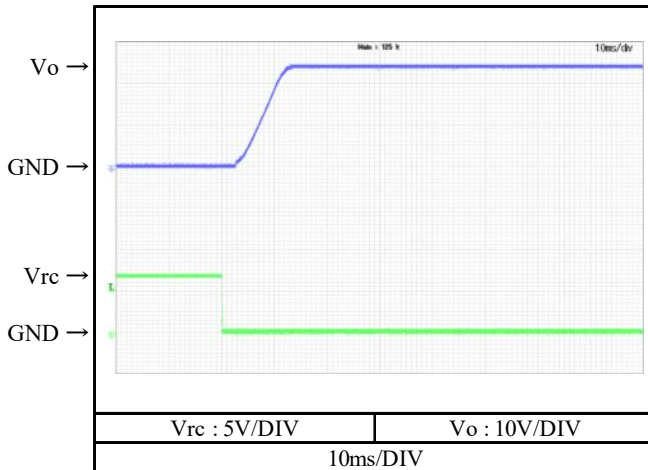
Output rise and fall characteristics with REMOTE ON/OFF CONTROL

Conditions V_{in} : 36 VDC

I_o : 100 %

T_a : 25 °C

$V_o=24V$

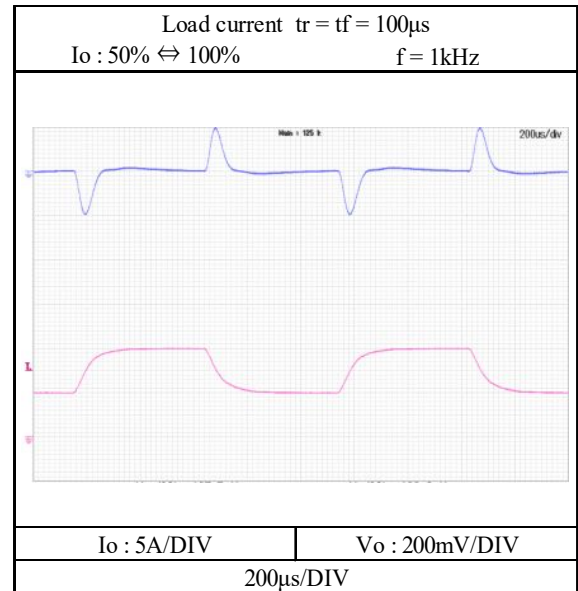
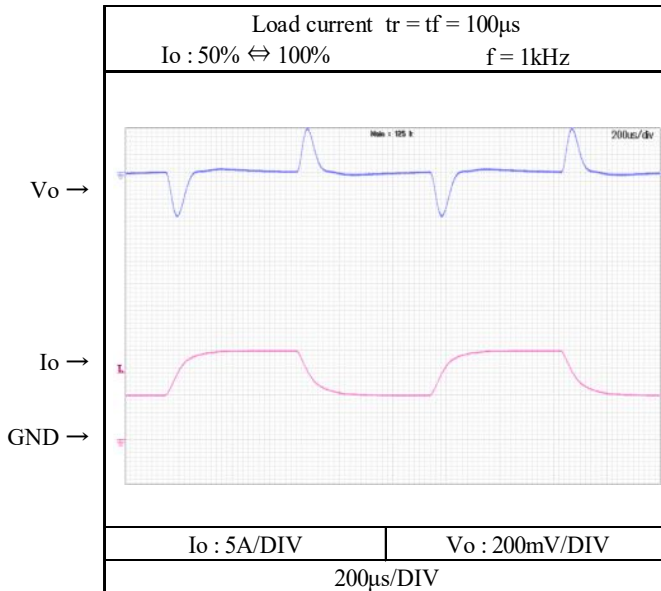


2-5. 過渡応答(負荷急変)特性 Dynamic load response characteristics

Conditions V_{in} : 24 VDC
 T_a : 25 °C

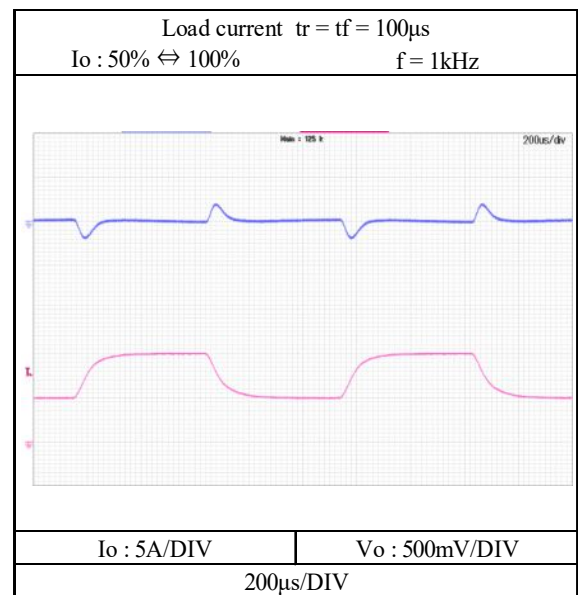
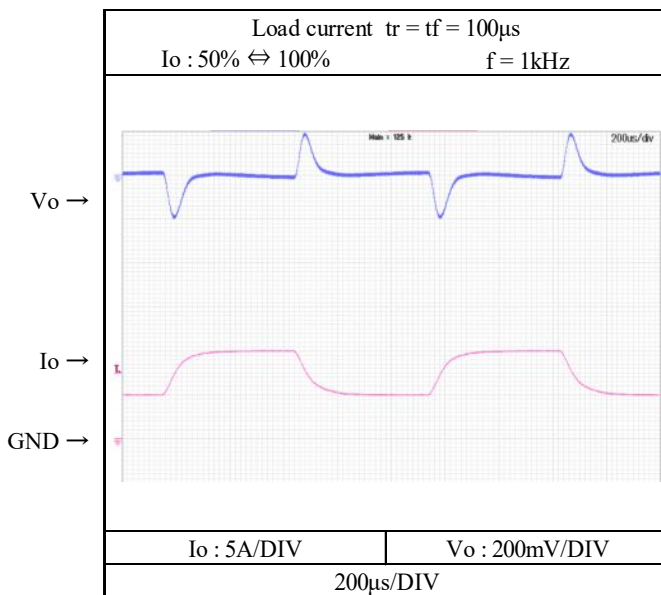
$V_o=3.3V$

$V_o=5V$



$V_o=12V$

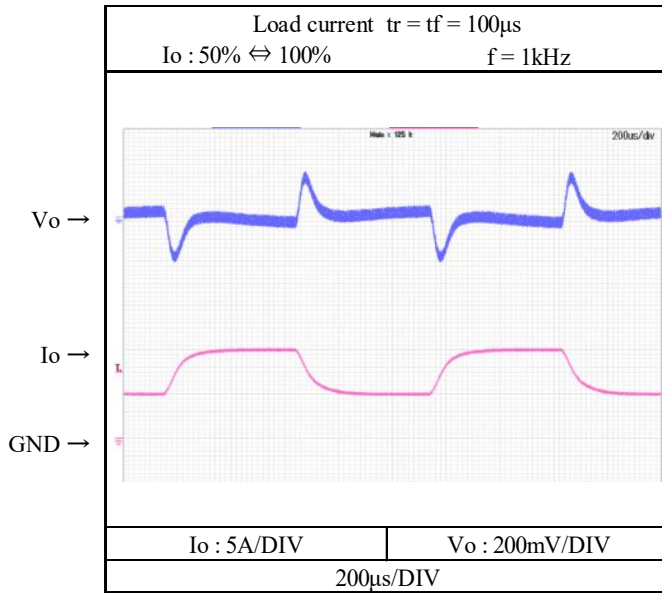
$V_o=15V$



2-5. 過渡応答(負荷急変)特性 Dynamic load response characteristics

Conditions V_{in} : 36 VDC
 T_a : 25 °C

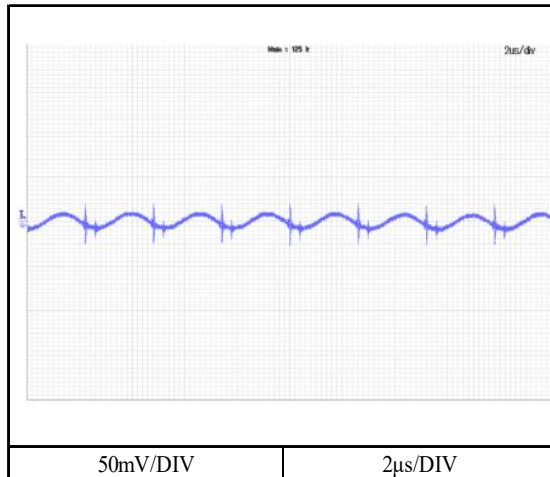
$V_o=24V$



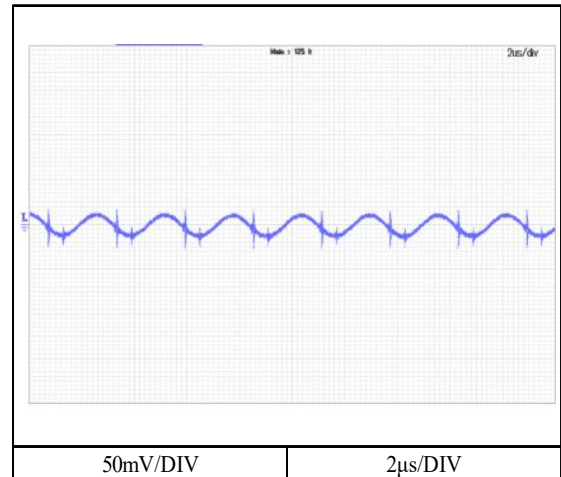
2-6. 出力リップル、ノイズ波形 Output ripple and noise waveform

Conditions V_{in} : 24 VDC
 I_o : 100 %
 T_a : 25 °C

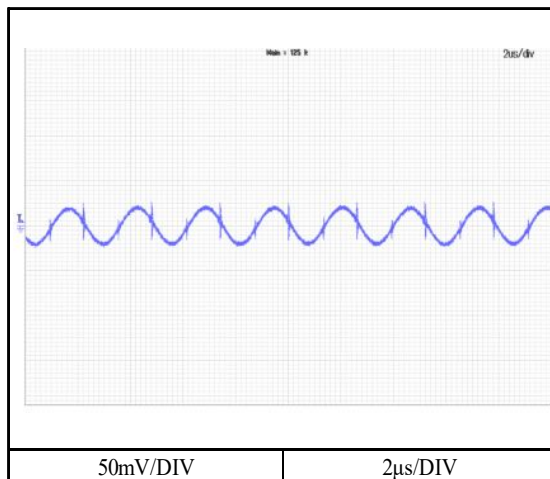
$V_o=3.3V$



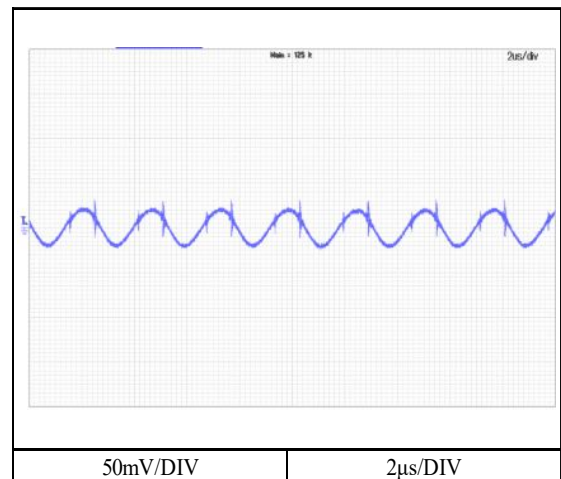
$V_o=5V$



$V_o=12V$



$V_o=15V$



2-6. 出力リップル、ノイズ波形 Output ripple and noise waveform

Conditions V_{in} : 36 VDC
 I_o : 100 %
 T_a : 25 °C

$V_o=24V$

